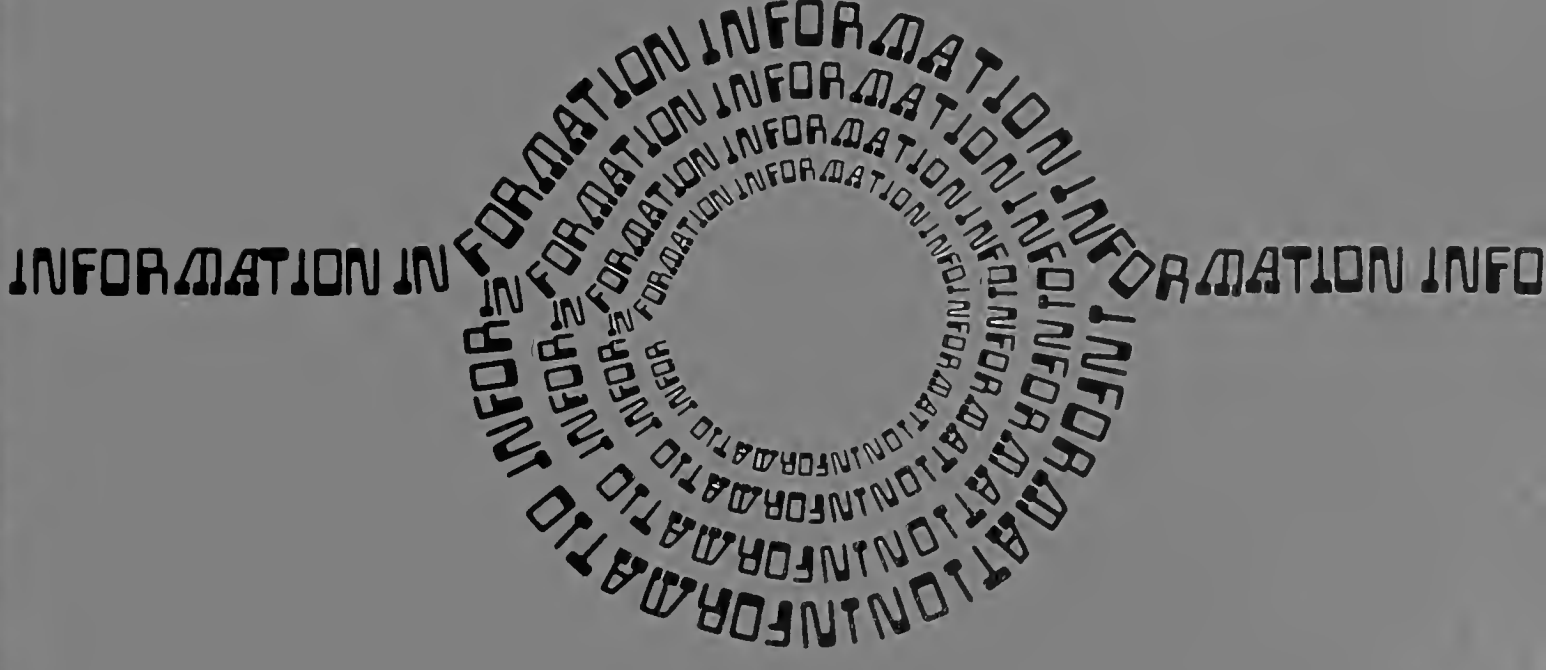
INFORMATION SYSTEM FOR DECISION-MAKING:
guidelines for operation



OFFICE OF THE SUPERINTENDENT OF PUBLIC INSTRUCTION, DOLORES COLBURG, SUPERINTENDENT

INFORMATION SYSTEM FOR DECISION-MAKING: GUIDELINES FOR OPERATION

SUPERINTENDENT OF PUBLIC INSTRUCTION

HELENA, MONTANA

1972

Preface to the First Printing

This Information System for Decision-Making has been developed, pilot-tested and revised over a period of some eighteen months. The initial development, pilot-testing and final editing were accomplished by personnel in the Research, Planning, Development and Evaluation Component in my office. The University of Montana's Division of Educational Research and Services was contracted to produce an audiovisual orientation package and to rewrite the original manual. My special thanks go to the school personnel in Simms, Sun River and Butte, Montana, who graciously cooperated in the pilot tests.

Dolores Colburg

DOLORES COLBURG
Superintendent of Public Instruction
Helena, Montana
March 1972

Preface to the Second Printing

The Information System for Decision-Making described in this manual has been applied in several different situations since the manual was first printed.

People in ESEA Title III projects in innovative education have been using the system to evaluate their efforts. The Vocational Education Component in the Superintendent of Public Instruction's office has used a modified version of ISDM to serve its information needs and simplify reporting procedures required of the state's schools. The authors of the system have applied it both as an evaluation and a planning tool in providing annual services to the Migrant Children Education Program in Montana. Personnel in a demonstration program in adult education have used the model for organizing information about their project and for evaluating it.

This manual has been requested by educators in more than forty states and three foreign countries. This tremendous response and the variety of applications the model has had in both planning and evaluation have prompted us to go to a second printing. We encourage educators with an interest in planning and evaluation to comment on the system.

ROBERT A. LEHMAN, Ph.D.
Acting Director
Research, Planning, Development
and Evaluation Component
July 1973

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INTRODUCTION

Educators everywhere are trying to keep pace with the rapid social, economic and technological changes in America today. A fourth-grade class studies forest ecology at an instructional center located in uninhabited woods twenty miles from its usual classroom. High school juniors work half-days for a month in community businesses and receive school credit for their time. Pre-school children from disadvantaged homes are provided with experiences that will help them compete with middle-class children in the first grade.

These examples, and hundreds of other new school activities, mark the trail modern education has blazed beyond the "Three R's." They are ambitious attempts to provide our younger citizens with the tools and knowledge needed to understand and live in the ever-more-complicated, ever-more-challenging world around us.

The new and exciting ideas in modern education represent what is perhaps the greatest strength of American educators--a willingness to think and act in terms of the future of the children they serve. Because of this orientation to the future, courageous educational policy-makers and administrators find themselves entering uncharted fields, using untested methods and materials. Their willingness to try suggestions made by parents, government, industry and students promises continued effort to achieve truly useful education for American children.

But promises are not enough. The challenges of the times invite skepticism. This skepticism can be healthy for educators if it is not blindly focused on past educational practices. The educators' recognition that perhaps education did not adapt rapidly enough to changes in the past should cause them to examine whether efforts at improvement are suitable and effective. It is no longer sufficient to merely assume that a program is meeting the needs it purports to serve.

Administrators, teachers, parents, community members and students all want to know whether a program is succeeding or not and why in either case. Among the many programs being developed, some will be truly effective. The remainder will include programs no better than, or worse than, the practices they seek to improve. That crucial distinction will not be made unless some means of determining success or failure becomes an integral part of all programs.

Determining program success or failure is not a new idea in education. As a process, it has been called various names which cover a variety of concepts. It has evolved from "answering to your boss" into a much more meaningful concept of "evaluation."

The Information System for Decision-Making (ISDM) outlined in this manual is based on a new concept of evaluation. The word "evaluation," as used in this manual, implies a process of identifying, describing, obtaining and providing useful information for decision-makers, so that they may better judge and choose among decision alternatives. In the past, the role of evaluation has been to approve or disapprove a completed program. This approach robbed the process of its greatest potential--program improvement. However, as a system of providing useful information, evaluation can help the decision-maker to informed judgments on needed program adjustments, thus assuring greater possibility of program success.

The assumption which underlies this new concept of evaluation is that decisions resulting from an investigation of all information about available alternatives should be consistently better than decisions arrived at by guess or chance. Decision-makers who agree with this assumption may find the evaluation process in the herein described Information System for Decision-Making a valuable tool for improving education.

Who are the educational decision-makers that this system (ISDM) might benefit? Primarily, they are those individuals who recognize that decisions affecting the form and substance of instruction are made on many levels--student, teacher, administrator, parent, local board member, state and federal officials--and those who believe that this evaluation system could apply to a broad range of situations. Effective use of the system involves two things: the decision-maker's dedication to improving program decision-making and his personal commitment to testing ISDM as a means to that end.

The ISDM concept of evaluation recognizes an unwelcome fact. Few decision-makers have either the time or the training to gather, analyze and prepare the information they know they could use in locating and judging alternative courses of action. In practice, this task is usually delegated. The purpose of ISDM is to systematically organize information-gathering efforts in an educational organization so that program status, progress and performance can be examined comprehensively. The task involves a cooperative effort between decision-makers and evaluators (information providers). Clear and constant communication between decision-makers and evaluators is a necessity if the information to be provided is to be accurate and pertinent.

The Information System for Decision-Making has four phases. In the first, a commitment to evaluation must be made, various policies affecting the operation identified, tasks and deadlines agreed upon, and personnel oriented and trained in the system. In the second phase, the program under evaluation must be described as accurately as possible in order to have a standard against which to compare later achievements, changes, improvements or differences; included in such a description would be boundaries, people and program characteristics, objectives, questions about those objectives and the program's decision structure. In phase three, data about the program is gathered; data sources are identified, instruments for data gathering are chosen or constructed, a useful scheme of data organization is developed. And in phase four, the raw data is transformed into useful information and is reported to the decision-maker. Depending on the decision-maker's needs, the system can provide him a single report, several reports or even a continuous flow of pertinent information.

1.1 Gaining Commitment

This Information System for Decision-Making can be a reservoir. It can generate information. It can store information. You, the decision-maker, can gain a permanent source for answers to your decision questions.

How can you utilize ISDM's potential?

ACTIVITY: Once convinced of the information system's value, the decision-maker will demonstrate his commitment to the evaluation by providing funds, time and personnel.

CONSIDERATIONS: Commitment implies the following:

(1) understanding the concept of evaluation as it is presented in this manual;

(2) accepting the contention that decisions based on valid information will be sound; and

(3) entering an agreement, formal or informal, to begin an evaluation.

1.1 Gaining Commitment (Continued)

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Meets with you, the decision-maker	By responding to your request for a conference with someone acquainted with the information system
	2. Explains scope and features of ISDM	By using orientation materials or through conversation with you
	3. Gains your commitment to evaluation	By forming an agreement for evaluation to begin

1.2 Identifying and Examining Evaluation Policy

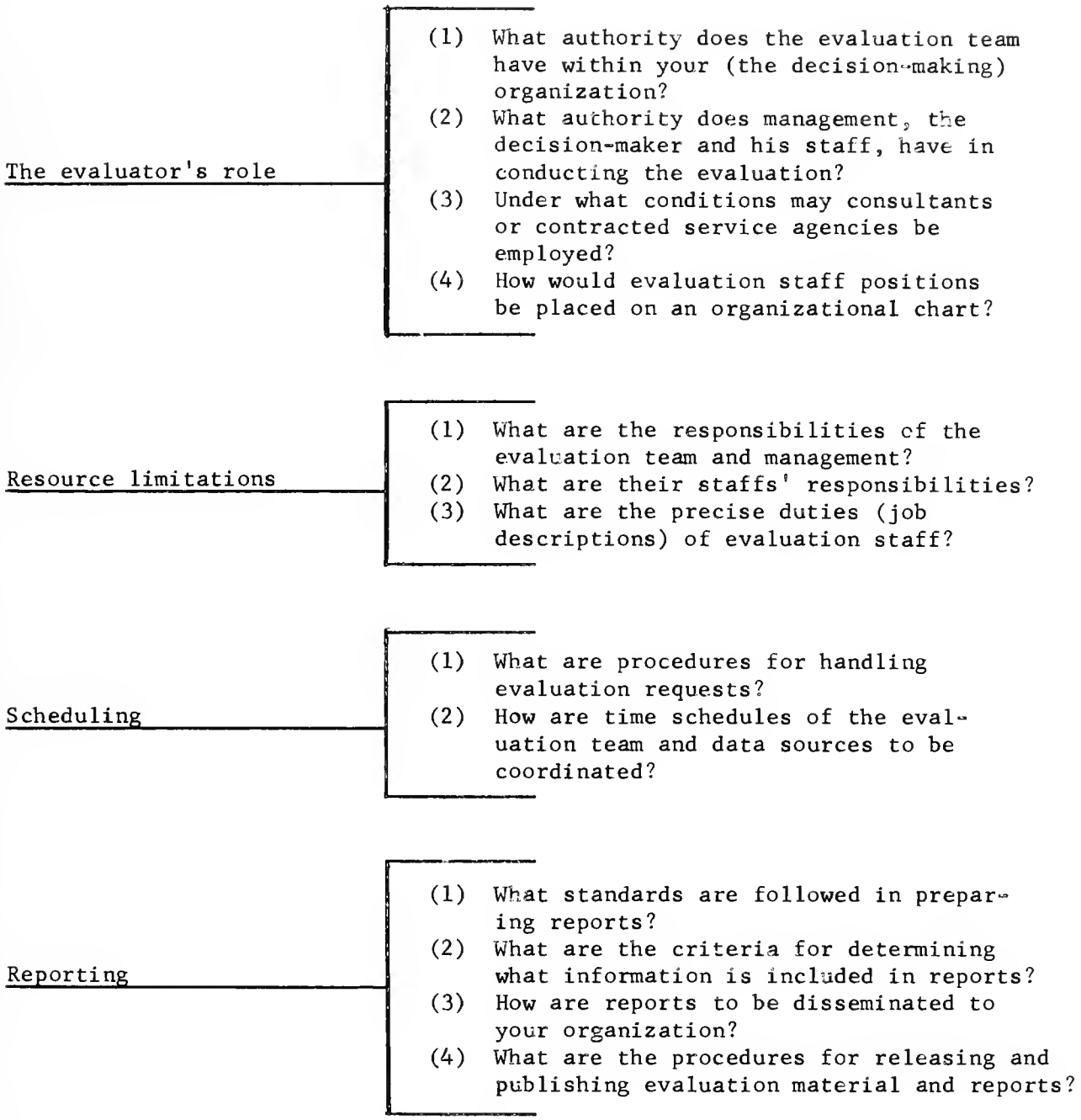
If ISDM is potentially a reservoir, your evaluation policies define its dimensions.

ACTIVITY: An evaluator will identify and examine policy defining his role and responsibility within the organization.

CONSIDERATIONS: Specifically, the evaluator needs the following policy information (see the chart on Guidelines for Classification of Policy Statements on page 9):

Access to data sources	(1) Who is entitled to examine records and other data sources? (2) Through what channels does the evaluator gain entitlement to data sources?
Access to data base and evaluation information	(1) What information is available to the evaluator? (2) How is availability determined? (3) How will the information be used? (4) What are the criteria for determining the use of information, e. g., aggregation (the way information is combined)? (5) To what extent must names and confidential materials be protected?

1.2 Identifying and Examining Evaluation Policy (continued)



It is within these seven policy areas that authority for existence of an evaluation team and conduct of an evaluation resides.

If these policy areas have been defined in writing, the evaluator need only collect and examine written statements in order to identify authority. When policy statements do not exist in these areas or conflict with each other, the evaluator must ask your assistance in (1) generating policies necessary for evaluation or (2) resolving conflicts among existing policies. In some cases, the evaluator may have to request special authorization to conduct activities undefined in policy statements. For example, if your organization has no policy statement on access to confidential data from student academic records and the evaluator needs data of this type, he must determine who has authority to release the information and must request its release.

WORK BREAKDOWN FOR DETERMINING EXISTING POLICY ON EVALUATION

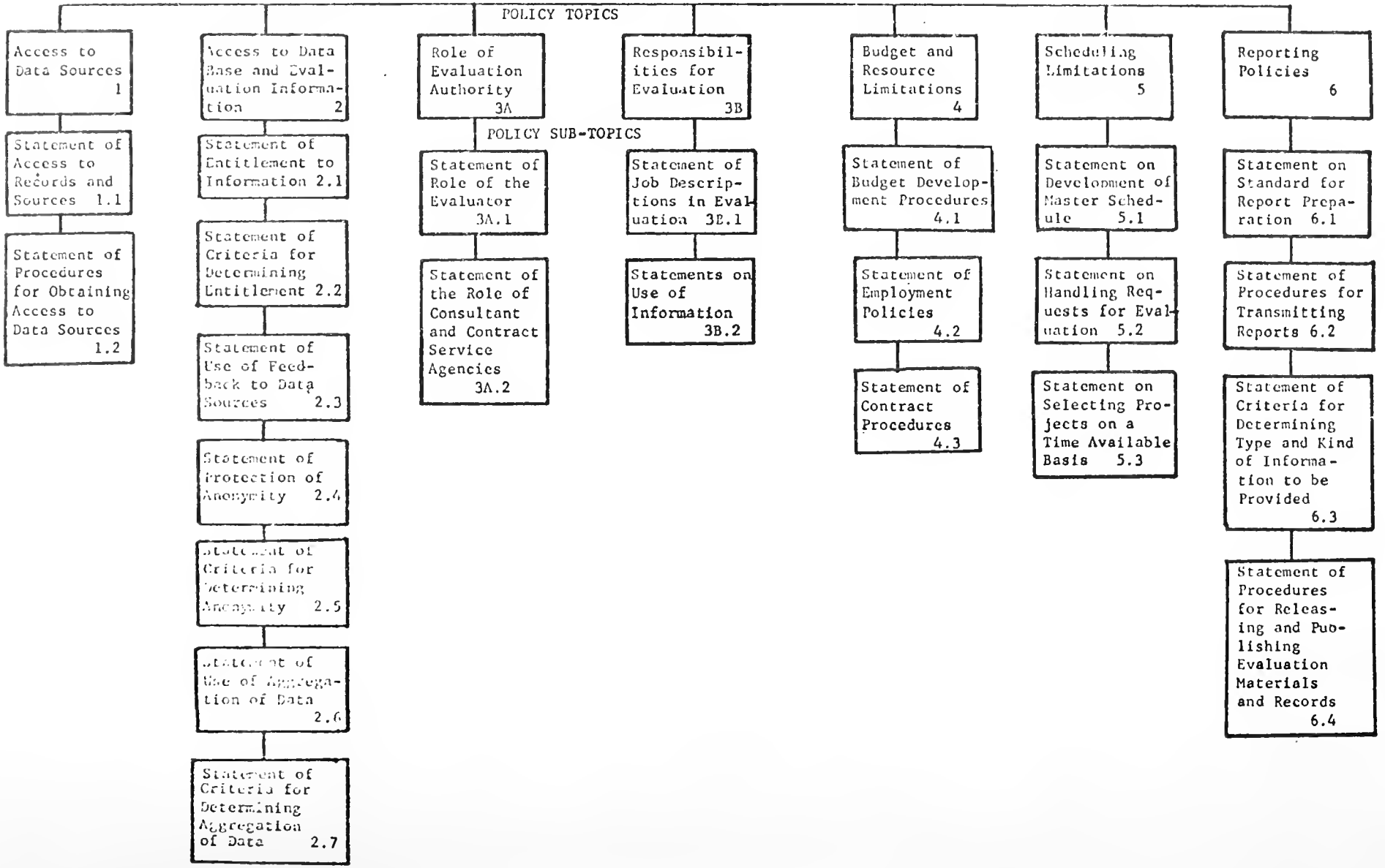
Who	Does What	How
Evaluator	1. Collects available statements of policy governing the organization and the program under study	By making prior arrangements with appropriate organizational and program personnel
	2. Completes and files forms classifying policy statements	By using Forms 1 and 2 (samples on following pages)

PROCEDURE WHEN EVALUATION POLICY DOES NOT EXIST OR CONFLICT

Who	Does What	How
Evaluator	1. Determines if policy statement exists for conduct of assigned activity	By referring to the form used to record applicable policy statements (Form 1, page 10)
	2. If policy exists, reports it as the authority to proceed	By writing memo
	3. Proceeds with activity	According to plan
	4. Reports lacking or conflicting statements of policy to appropriate evaluation and program personnel	By writing memo or scheduling meetings
	5. Determines with policy-maker the authority to proceed	By submitting Form 2
	6. Assigns or reassigns activity	By conferring with staff member
	7. Classifies, codes and files statement of resolution	According to established procedure

GUIDELINES FOR CLASSIFICATION OF POLICY STATEMENTS

THESE GUIDELINES FOR CLASSIFYING POLICY STATEMENTS ARE TO BE USED BY THE EVALUATOR IN COMPLETING FORM 1



(This form completed as an example.)

FORM 1

CLASSIFICATION OF POLICY STATEMENT

INSTRUCTIONS: Form 1 will be used for classification and storage of policy statements. Statements are to be taken from policy documents obtained in Steps 1-2 of work breakdown for Section 1.2. Statements are selected and classified by topic. "Topic" refers to the topics mentioned in the narrative to 1.2. The topic code and sub-topic code are obtained by referring to the Guidelines Chart. "Source" refers to the policy document from which the statement was taken. Each statement is to be written verbatim on this form.

Topic: *Budget and Resource Limitations* Date: *10/21/72*

Topic Code: *4*

Sources: *School District #1 Governing Codes*

Statement	Sub-Topic Code
"The Board shall approve any contract made between any person or organizations not employed by School District #1 and any school, commission, or person that is part of, or employed by, School District #1." (Governing Code 5.12A)	*4.3*

STATEMENT OF AUTHORITY TO PROCEED

(Form completed as an example.)

FORM 2

INSTRUCTIONS: Form 2, Part A, will be submitted by the evaluator to the program policy-maker to obtain authority to proceed with evaluation in a situation in which there is either a lack of policy or in which written policy statements conflict. Part B will be completed by the program policy-maker and returned to the evaluator. A separate form should be prepared for each situation.

PART A (To be completed by evaluator)

To: *John B. Chairman*

In our review of policy statements of your program we find that

[ ] No statement of policy exists

[x] Conflicting statements of authority exist

regarding the following topic, as described:

School District #1 Governing Code Number 3.41B states that "the Board shall determine which persons may review personnel files." At Washington Junior High, the principal reserves the right to grant permission to inspect personnel files.

For the evaluation to proceed, authority should be granted to *Robert L. Evaluator* in order that *he may inspect the Washington Junior High personnel files and complete a description of information available on math teachers in School District #1.*

Please supply a statement of policy that will (clarify/define) a resolution of this conflict.

Date *3/21/72* Name *Robert L. Evaluator* Title *Evaluation Coordinator*

PART B (To be completed by program policy-maker(s). Statement of authority to proceed: (If resolving a conflict of existing policies, please describe specifically how those policies are to be amended.)

Evaluators participating in the study of School District #1 math programs shall have access to the personnel files in all schools. The principal of Washington Junior High School has been so informed.

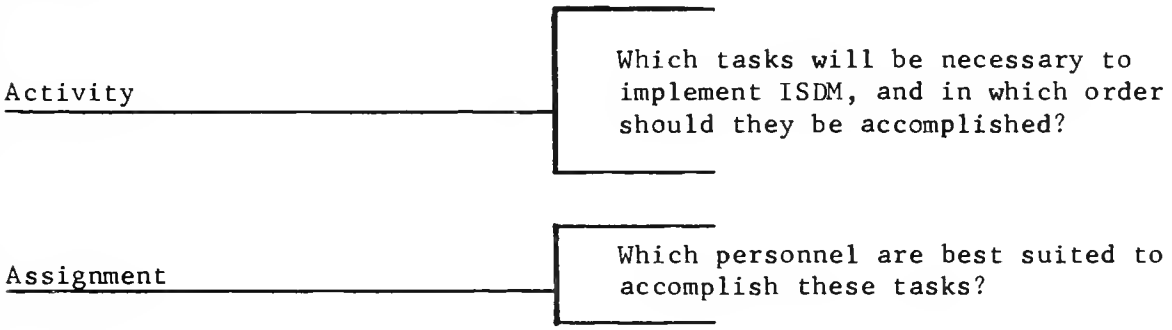
Date *3/28/72* Name *John B. Chairman* Title *Board Chairman*

1.3 Developing an Evaluation Schedule

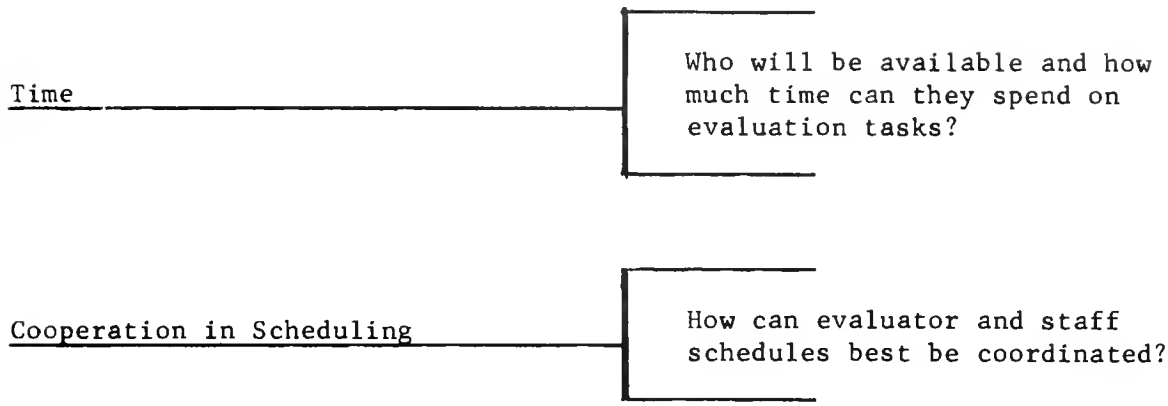
A master schedule for evaluation functions much as a building contract. In building the ISDM reservoir, the master schedule lists what work is to be completed by what dates. In this case, it also lists the personnel, who like sub-contractors, will be assigned specific responsibilities in the overall project.

ACTIVITY: An evaluator will develop a master schedule (time line) for completing the activities defined in this ISDM manual and will assign tasks to personnel.

CONSIDERATIONS: Cooperation between management and evaluation staffs is extremely important since the master schedule involves identifying and assigning tasks. The evaluator will provide answers to the following questions:



1.3 Developing an Evaluation Schedule (continued)



Further, the master schedule will

(1) set major deadlines,

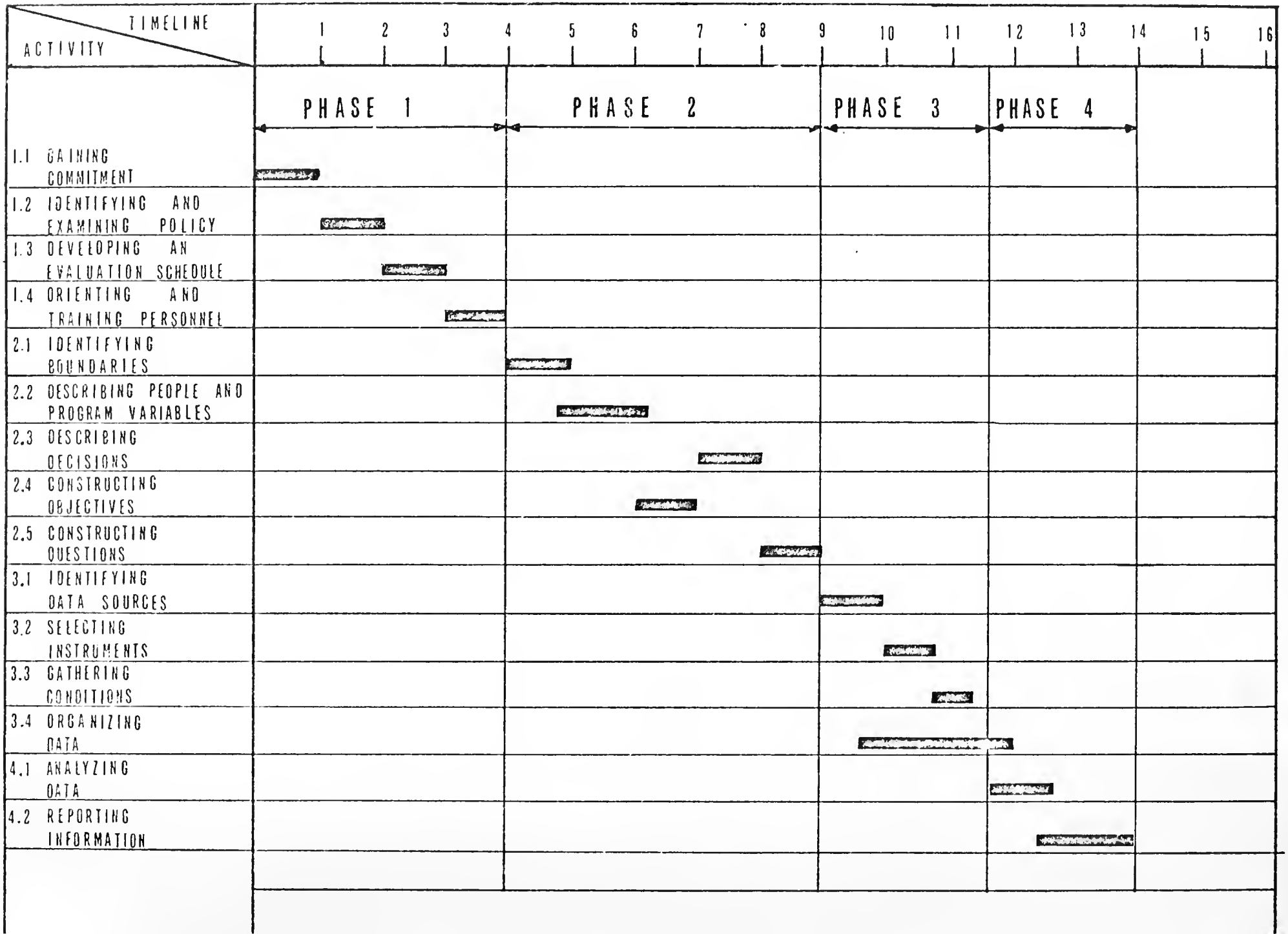
(2) show relationships among activities to be completed in ISDM, and

(3) provide a concise breakdown of all steps in the system.

An example of a master schedule follows.

(Form completed as an illustration)

FORM 3



1.3 Developing an Evaluation Schedule (continued)

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Develops a master schedule for completing evaluation tasks	By identifying tasks to be performed, including those throughout the ISDM manual; identifying resources and personnel available; and assigning tasks and completion dates

1.4 Orienting and Training Personnel

Informed, trained personnel will build the ISDM reservoir which will hold the resource--information--vital to evaluation.

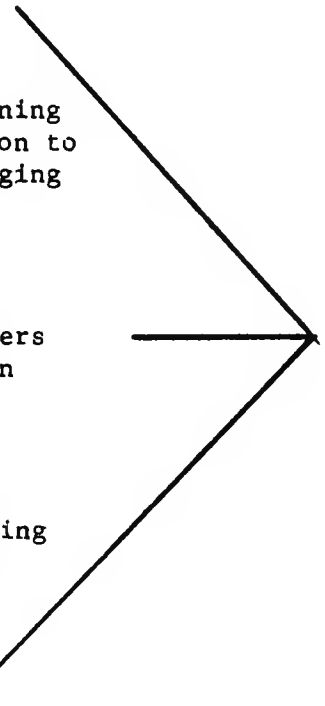
ACTIVITY: An evaluator will orient personnel to the application of evaluation to decision-making and will train personnel in the use of ISDM.

CONSIDERATIONS: Evaluation orientation and training must communicate the following ideas:

(1) Evaluation is a process for identifying, describing, obtaining and providing useful information to decision-makers for use in judging decision alternatives.

(2) Providing answers to questions that the decision-maker considers important is the major function of ISDM.

(3) ISDM employs a workable method for producing information leading to identification of needs and barriers to success.



Audience

Any person associated with the evaluation project

1.4 Orienting and Training Personnel (continued)

After orientation, the evaluator must train personnel who will have specific roles in the implementation of the information system. Personnel must be shown what the information system can do and what is required of individuals operating the system.

ISDM requires specific understanding by all personnel who will be working with it. Informal, open orientation and training sessions and question-and-answer sessions combined with visual aids are recommended.*

*A slide-tape Training Packet for ISDM is available from the Office of the Superintendent of Public Instruction, Helena, Montana 59601.

1.4 Orienting and Training Personnel (continued)

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Acquaints decision-maker with importance of evaluation as a decision-making aid	By giving informal presentations and interviews
	2. Trains those persons who will use the information system	By giving more formal presentations, usually designed to include use of training packages
	3. Orients all who will perform tasks using the Information System for Decision-Making	By an open-ended program that would combine question and answer sessions and visual aids presentations

PHASE II - DESCRIBING A PROGRAM

2.1 Identifying Boundaries

The land topography, water source and dam all place boundaries on a reservoir, just as various legal, operational and financial structures place boundaries on your program.

ACTIVITY: The evaluator will obtain a general description of the program under study, based on whatever factors fix or limit that program.

CONSIDERATIONS: Boundaries are legal, operational or financial limitations which affect activities within a program. All boundaries must be identified before the evaluator can describe the actual program. Possible limiting factors include:

Legal Boundaries: federal, state, or district rulings, regulations or policies;

Operational Boundaries: program objectives or activities; and

Financial Boundaries: program costs, federal, state or district funds available.

2.1 Identifying Boundaries (continued)

Each boundary description of a program should answer the following questions:

- What is the name of the program?
- What is the program authority?
- What can the program do? What can't it do?
- What persons or offices will benefit from program activities?
- What method or procedure does the program follow?
- Who applies the method?
- What is the geographical, educational, demographic scope of the program?
- How much does the program cost and what is the source of funding?
- What schedules and deadlines must be met by the program personnel?
- What other programs, if any, come under this program's supervision?
- Who can supply further information?

The preceding examples are likely to apply in all evaluation cases. However, additional program boundaries may be identified as program questions are formulated in Section 2.5.

To facilitate the collection of boundary data, special forms should be filled out by appropriate program personnel and made available to the evaluator (see form 4 on pages 23 and 24).

2.1 Identifying Boundaries (continued)

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Explains to appropriate program personnel the kinds of data that are required for the purpose of identifying boundaries	By scheduling appointments
Program Personnel	2. Fill out form 4	By providing the boundary data requested by the evaluator
Evaluator	3. Meets with program personnel to collect forms, answer questions and hear comments	By scheduling appointments
	4. Examines completed forms to determine whether necessary data has been provided. Recycles to Step 1 if data is insufficient	By comparing available data with boundary description
	5. Prepares data for appropriate file	By editing, rewriting as necessary to assure uniformity of style
	6. Meets with appropriate program personnel to secure approval or non-approval of edited material. Recycle to preceding step if necessary	By scheduling appointments
	7. Obtains final approval and files boundary data	By obtaining signature of the decision-maker

(Form completed as an illustration.)

FORM 4

SUMMARY OF A PROGRAM

1. Title and Number of Program: *"AIM" Achievement Improvement in Mathematics*

2. District(s) Participating: Include name, number and county.

District #1, Lyndale, Montana - Alkali County

3. Intent/Purpose: What is the program(s) to provide, assist, regulate etc.? For what reason, with what goals and/or governed by what philosophy?

To improve attitudes and achievement in mathematics for under-achievers and slow and reluctant learners

4. Audience Identification: Specify persons or offices to benefit from your activities (e.g., teachers, handicapped students, districts, school staff, etc.).

Designed for 9th grade slow and reluctant students in mathematics

5. Execution/Procedure: How is each project carried out? Through what agencies and/or organizations? Involving what staff members (by title)?

Students are involved in a mathematics laboratory approach to learning to give them "handson" experience and to allow them to participate in a mental, physical and social learning process. The program is using materials developed by similar programs in other states and commerical products as well as materials developed locally

Henry Fleming: Federal Education Director

Alex Gregory: Program Supervisor

Pilot Teachers: James Allen

Shirley Erite

June Moritz

Richard Roe

6. Scope: In what areas does the project(s) operate (geographical, educational demographic)?

Currently serving approximately 280 9th grade Lyndale Public School students. Next year to be expanded to 10th grade and later disseminated statewide.

7. Finances: Indicate source, amount and duration of funding.

Duration of funding is July 1, 1970, to June 30, 1971, under ESEA Title III in the amount of $53,645.00. Program may make application for a continuation grant for a maximum of two additional years.

8. Deadlines/Schedules: What dates and/or time limitations are important to, or must be observed by, the program and its participants?

ESEA application deadlines: April 1, 1971; April 1, 1972

Summer workshop: June 21, 1971 - August 13, 1971

Materials ready to begin dissemination: September 1, 1971

University of Eureka Evaluation Completion: March 26, 1971

Final Program Report: June 30, 1973

9. Contact: Name and position of staff member who may be contacted for additional information or clarification about the program.

Alex Gregory, Progam Supervisor

1234 Warren, Lyndale, Montana 59666

Date: *3/9/71* Completed by: *Evaluation Coordinators*

2.2 Describing People and Program Variables

Two major considerations in building a reservoir are the water supply, and how it flows. Similarly, the supply and flow of valuable information within your organization affect the building of an ISDM evaluation.

ACTIVITY: The evaluator will describe the program in terms of its organization, activity and content, methods, facilities and cost, and personnel according to demographic characteristics.

CONSIDERATIONS: This description, recorded on ISDM forms, will chart both available program information and the flow of that information within your organization. (See forms 5, 6 and 7.)

For his description, the evaluator must determine and then record who has information and where it is located so that it may be easily collected later. Identification of policy (Section 1.2) and boundaries (Section 2.1) will be useful.

People Variables

The evaluator will record data about persons or entities affecting your program: students, teachers, administrators, specialists, family and community, for example. At this point, the evaluator will determine only what kinds of demographic data are available; specific demographic data may be required later in the evaluation.

To illustrate, the evaluator might need to know if the following types of demographic data are available for each of the persons or entities described:

Administrators, Teachers, Specialists

- educational background
- work experience
- salary
- professional affiliations
- non-professional affiliations
- other data

Students

- age
- grade level
- sex
- achievement
- health (physical, mental, emotional)
- other data

Family

- size
- age
- distribution
- income
- residence
- education
- mobility
- other data

Community

- geographic setting
- history
- population
- economic and social structures
- government
- power structure
- socioeconomic stratification
- commercial and financial status
- other data

A special form indicating the name of the person or entity being described and listing what data is available from what sources is recommended. (See sample form 5.)

Since information on this form will be utilized in the decisions, objectives and questions (Sections 2.3, 2.4, 2.5) of your program evaluation, the evaluator will record it as accurately and thoroughly as possible. The exact title for each person or entity will be recorded; data source will be described fully, so, if necessary, the evaluator can return to that source; data will be precisely labeled. For example, if an aptitude test score is part of the data on a pupil, the name and form of that test should be recorded.

Program Variables

A similar method will be used to describe program variables: organization, activity and content, method, facilities and cost.

It should be re-emphasized that at this point the evaluator is concerned with describing rather than collecting data on factors affecting your program. Below are examples of the kinds of data he needs:

Organization: organizational chart, description of work division within program;

Activities and Content: activities--description of planning activity, (e.g., review of current programs, definition of needs and opportunities, identification of programs, study of proposed solutions, etc.), description of tasks performed to implement the program (e.g., how planning objectives and program coordination are achieved); content--topical description of subject matter (e.g., a listing of concepts emphasized in the program);

Method: description of approaches (e.g., practice-oriented, machine-aided, media-supplemented, teacher-guided, student-guided, etc.);

Facilities: description of space and equipment (e.g., regular classroom with Free Response Teaching Machines, 8 mm single concept loop films, calculators, etc.); and

Cost: description of itemized and total budget on facilities, maintenance and personnel.

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Determines and records who has information on people or entities affecting the evaluation program and records the location of information	By reviewing Sections 1.2 and 2.1
	2. Determines and records what data is available on the program under study, organization, activity and content, method, facilities and cost, and records the location of data	By using form 6
	3. Determines and records what data is available on the people in the program	By using form 5

FORM 5

PEOPLE DESCRIPTIONS (Form completed as an illustration)

INSTRUCTIONS: Write the name of the program or project, its location and the date of the report in the spaces provided. Check the group being reported (e.g., student). Report for each source collected the characteristics contained.

NAME OF PROGRAM: "AIM"

ADDRESS: Lyndale, Montana

DATE: June 1, 1971

GROUPS

a [X] Student

b [ ] Teacher

c [ ] Supervisor

d [ ] Administrator

e [ ] Family

f [ ] Community

g [ ] Other

CHARACTERISTICS	SOURCE	LOCATION	FREQUENCY OF COLLECTION
1. Name 2. Address 3. Iowa Silent Reading Test A) date tested B) grade C) form D) rate a) GE - Grade Equivalent b) PR - Percentile Rank c) S - Stanine E) comprehension a) GE b) PR c) S F) directed reading a) GE b) PR c) S G) word meaning a) GE b) PR S	Student files	Mr. Jone's office, Lyndale Jr. High	Annually

DESCRIPTION OF PROGRAM

FORM 6

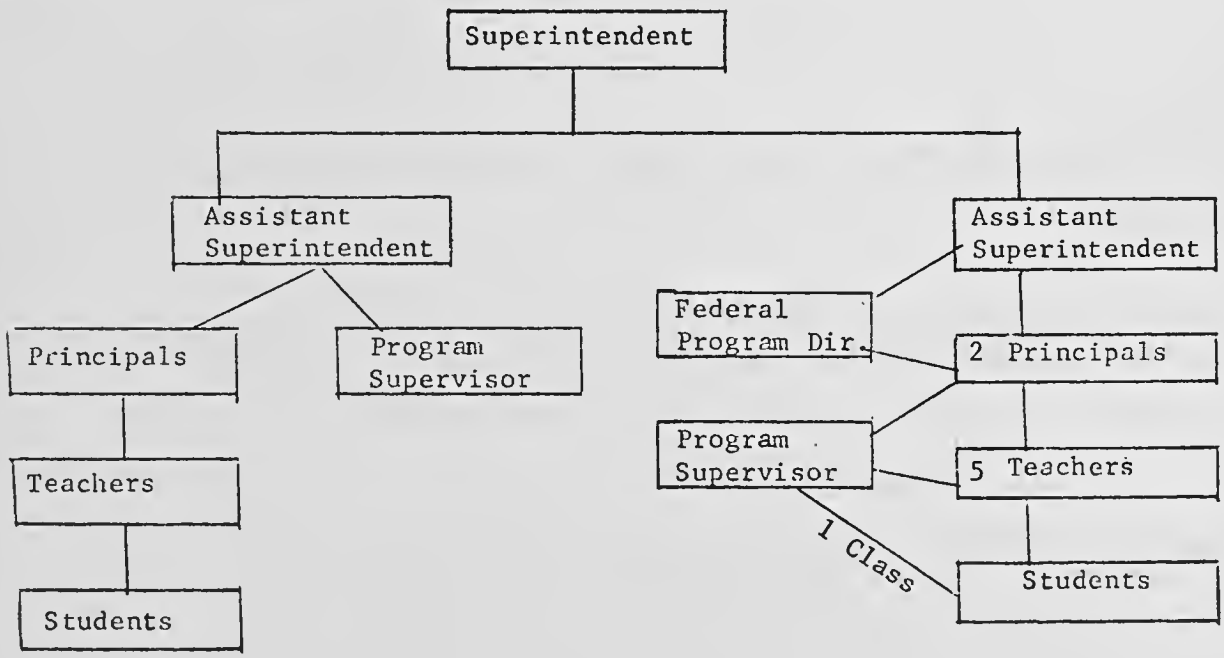
INSTRUCTIONS: This form is designed to provide the evaluator and, subsequently, the decision-maker with a clear description of a project. Consequently, the person completing the form should respond to each item in sufficient detail to fully describe the program. It is suggested that the respondent ask for a review of the completed form by a staff member outside his program. This review should serve as a clarity check.

1. Title and number of Program

"AIM" Achievement Improvement in Mathematics

2. Organization

Describe your program by constructing an organizational chart indicating the horizontal and vertical structures (i.e., parts of an organization at the same level and the up and down dimensions of an organization).



DESCRIPTION OF PROGRAM (PAGE TWO)

3. Content

Describe the structure or body of knowledge which is identified with the subject matter of the discipline. It could be described through a structure of topics to be covered within and across grade levels (e.g., composed of eleven mathematical concepts with emphasis placed on vocabulary and application of these concepts).

Whole numbers, fractions, decimals, per cent, pre-algebra, algebra and geometry are covered from a real basic approach to the more complex operation needed in performing the above objectives.

4. Method

Describe the process or processes used to implement the content described in Item 3; (e.g., individualized instruction, multi-media approach, non-graded class structure, supplementary teacher training, etc.).

The laboratory approach is used with a "hands on" experience for the pupils with an interest being placed on the student's own needs. Mathematical games and manipulation devices are used to strengthen the basic concepts of the program.

5. Facilities

Describe the space, special equipment and expendables pertaining to your program (e.g., defined by a regular classroom setting, the Free Response Teaching Machines, prototype electronic machine 8 mm single concept loop films and calculators).

2 classrooms and equipment: Calculators are used to check basic skills. Tables and chairs replace desks. A Thermofax copier is utilized in the program. A file cabinet, along with storage shelves are also necessary.

DESCRIPTION OF PROGRAM (PAGE THREE)

6. Cost

How much money is required for:

a)	facilities	*$30,000*
b)	maintenance	*$ 3,645*
c)	personnel	*$20,000*
d)	TOTAL	*$53,645*

Date *6/1/71* Completed by *John Doe, Evaluator*

2.3 Describing the Decision Structure

Surveys of purpose, site and water flow are basic to the work of those designing reservoirs.

Descriptions of purpose (change situation), site (program organization), and flow (information flow) are used by evaluators in planning an information system. In combination, these descriptions define a program decision structure.

ACTIVITY: The evaluator will describe the program decision structure.

CONSIDERATIONS: Information needed to describe a decision structure includes

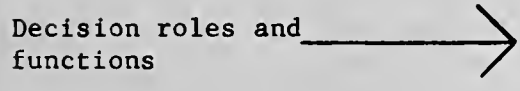
- boundaries within which decision-making occurs,
- decision-making procedures and activities within these boundaries,
- roles and functions of program decision-makers,
- information currently used by program decision-makers.

In the ISDM, three surveys provide the data from which the description of program decision-making is compiled. The nature of these surveys is described in the following chart.

DESCRIPTION OF
PROGRAM DECISION-MAKING

Legal authority and responsibility of the program	→	A statement of laws and/or policies specifying duties and responsibilities.

A classification and analysis of the purposes and objectives of programs under study, e.g., ESEA Title I would be classified as a federal legislative action (influence for change) designed to change the national school system (unit of change) by supporting local district programs designed to meet the needs of "educationally deprived or disadvantaged" students (subjects of change).



An identification of the decision-making hierarchy (organizational charts, etc.). The charting of decision roles as related to eleven basic decision functions.

Locating forms and reports, determining storage method of forms and reports, defining flow of information, defining audiences for information, stating when information will be needed.

Each survey is discussed in some detail later in the Section. The information in these surveys is used to answer the following questions fundamental to information-system planning:

- Who has legal authority for decision-making?
- Who has delegated responsibility for decision-making?
- What are the decision influencers (influence for change)?
- What are the decision ratifiers (subjects of change)?
- Who are the probable audiences for information?
- With what level of information--detailed report, summary, media presentation--are audiences to be provided?

- When is the information needed?
- Can the evaluator meet the decision-maker's timetable?
- Is it technically feasible to provide the information?
- What information is already available?
- What is the change setting (large change with small amount of supporting information, small change with small amount of supporting information, small change with much supporting information)?

SETTING BOUNDARIES FOR PROGRAM DECISION-MAKING

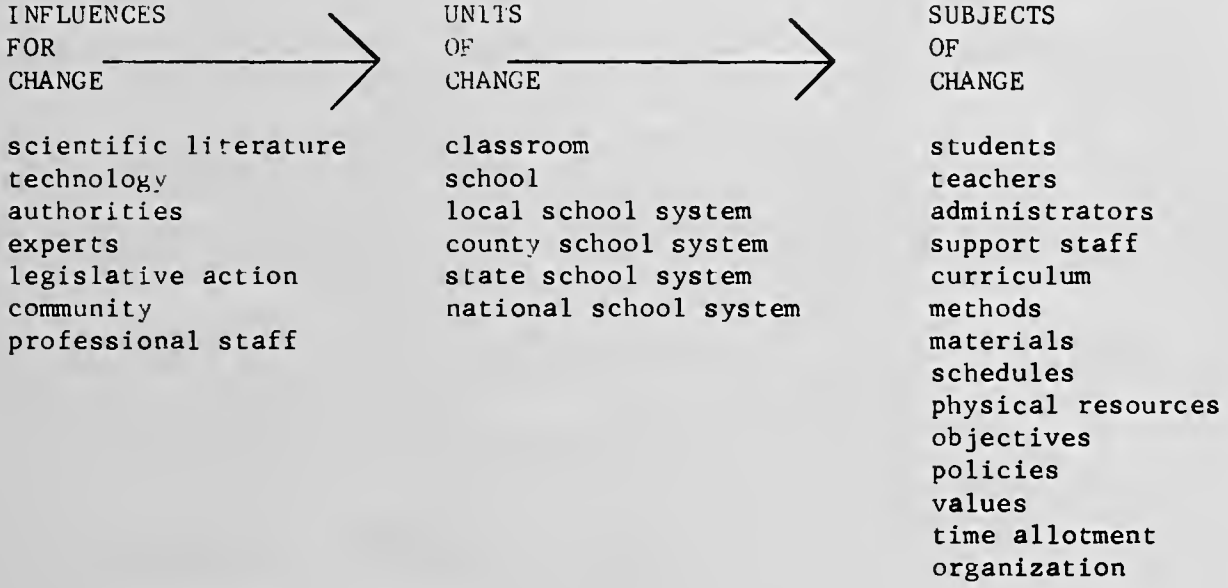
The boundaries of decision-making include legal, operational and financial limits. These limits are classified and reported on form 9, Report of Program Change Situation. Sources of information useful in completing this summary form include

- statements of law and/or policy governing program operation,
- form 4, Summary of Program Operation,
- form 6, Program Description,
- a list of program objectives.

The purpose of this form is to summarize the factors affecting decision-making in the program organization.

Four classes of factors are considered: purposes, influences for change, units of change and subjects of change. Purpose statements may be found in

program law, policy and objectives. Some examples of influences for change, units of change and subjects of change are as follows:



Examples classified as subjects of change may operate as influences for change and vice versa. To illustrate: To improve the reading performance of students (subject of change) in a third-grade classroom (unit of change), a principal (influence for change) may teach his staff (subject of change) new methods (subject of change). Or students (influence for change) might attempt to influence action (subject of change) of the state legislature (unit of change).

DECISION-MAKING IN PROGRAM OPERATION

Having set the decision-making boundaries for a program, the information system designer next needs to find how the work of decision-making is being

accomplished for the program. Sources of information for this description are the organizational chart and the data obtained from program personnel on form 8, Description of Decision Structure.

The data from form 8 is used to classify the role and functions of each decision-maker. The roles are:

R--responsibility for initiating and carrying through decision action,

I--informing others of decisions,

A--approving decisions made by someone else, and

C--consulting on decisions.

The functions are:

1. defining a population to be served,
2. setting program objectives,
3. changing program objectives,
4. setting relative importance of program objectives,
5. changing relative importance of program objectives,
6. establishing and replacing policy,
7. establishing, modifying or replacing a program,

8. employing, assigning and replacing personnel,

9. budgeting, purchasing and accounting,

10. collecting and disseminating information, and

11. evaluating.

A sample chart illustrating how roles and functions are related follows:

DECISION STRUCTURE CHART

Program: Reading

Organization Role	Function Examples (from decision functions on preceding page)			
	Setting program objectives	Changing program objectives	Setting relative importance of program objectives	Changing relative importance of program objectives
Board of Trustees	A	IA	IA	IA
Superintendent	IA	IA	IA	IA
Principal	IA	IA	IA	IA
Program Director	IR	CAI	IR	CAI
Teacher	CA	IR	CA	IR
Specialist	C	C	C	C

R--Initiates I--Informs A--Approves C--Consults

Using the chart the evaluator can locate positions where program information is collected and distributed, (R-roles); audiences for program information, (A-roles); program influencers, (C and A roles); and, lines of communication, (I-roles).

INFORMATION FLOW

A survey of the collection and use of written information in program decision-making is the third step in describing the decision structure. This description includes:

- charts of the flow of forms and reports,
- a review of items of data collected,
- schedules of data collection and reporting,
- descriptions of data storage and retrieval,
- lists of audiences for information,
- copies of form 7, Report or Form Description, for all program forms and reports.

Data from this survey serves a dual purpose. It forestalls duplication of effort in data gathering. In combination with data on the change situation and role function description, it helps define decision-making information needs.

Writing a decision structure description makes it possible for you and the evaluator to:

- examine the relationship of the organizational and decision structures,
- locate major change influences affecting the program,

2.3 Describing the Decision Structure (continued)

. obtain information for writing job descriptions,

. obtain a calendar of major reporting dates,

. locate program audiences, and

. determine types of information to be supplied to them.

A study of a decision structure could go into much greater detail. The list described, however, includes items which are considered basic to implementation of ISDM.

WORK BREAKDOWN FOR DETERMINING THE DECISION STRUCTURE

Who	Does What	How
Evaluator	1. Contacts program personnel to arrange delivery of forms 7 and 8, delivers forms, and collects completed forms	By telephone or in person
	2. Records staff positions	Using form 5
	3. Organizes staff positions on a chart	Using classification system: R--Responsibility for initiating I--Informs others A--Approves C--Consults
	4. Adds objectives and purpose statements (see Section 2.4)	On form 8
	5. Combines influencers and ratifiers from form 8 with report of program function or change situation, form 9	By compiling a composite list
	6. Files forms	According to plan

WORK BREAKDOWN FOR DETERMINING THE CHANGE SITUATION

Who	Does What	How
Evaluator	1. Obtains form designed to report program function or change situation and obtains program boundaries for the program under study	According to filing policy
	2. Records program function	According to the requirements of form 9
	3. Records statement of purpose and funding source	By attaching copy of list of purposes and recording funding source on form 9
	4. Identifies questions important to evaluation planning	By reviewing change situation
	5. Obtains list of objectives (see Section 2.4)	According to filing policy
	6. Records objectives	By attaching copy of list to form
	7. Analyzes purpose, statement, and objectives	By reading to determine modes of influence, units and objects of change, and referring to discussion of change situation
	8. Records influences for change, units and objects of change for each statement of purpose and objective	According to the requirements of form 9
	9. Files form	According to plan

(Form completed as an illustration.)

REPORT OR FORM DESCRIPTION
FORM 7

INSTRUCTIONS: Complete this form for each form or report that originates or terminates with you, or passes through your hands. Please obtain a copy of that form or report and submit attached to this instrument.

RETURN TO EVALUATOR BY: *September 13, 1973*
(date)

Complete title of form or report: *Quarterly Financial Report*

Form or report number (if applicable) *1973-3*

Where does report originate? *School District Financial Officer*

Where is the final destination? *Board of Trustees*

(indicate all recipients of the report)

Is there any part of this form or report required by law? Yes ☐ No ☒ *x*

If yes, indicate items on the report and specify law

Frequency of submission *Four times a year*

Explain purpose of report or form and show route: (use back if necessary)

Accounts for income and expenditures of district funds.

Routing: Financial Officer

Superintendent

Board of Trustees

Date: *7/25/73* Completed by: *Marvin B. Accountant*

DESCRIPTION OF DECISION STRUCTURE

FORM 8

INSTRUCTIONS:
1. Write your name, title and date you completed the form in the space provided.
2. Read each decision-making activity and relate it to the program to which you are assigned.
3. If you do not participate in the described activity, indicate in the space provided.
4. If you do participate, please check the statement or statements in Column 2 which best describe your participation:
   a) list the names of staff members whose decisions you approve,
   b) list the names of individuals and/or programs within the organization with whom you consult, and
   c) list the names of staff members to whom you report the decision(s).
5. If you have questions about the form, call Director of Evaluation.
6. When you have completed the form, sign it and return to the Evaluator.

NAME: James Brady TITLE: Director PROGRAM: Federal Programs DATE COMPLETED 2/2/72

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
1. what population is to be served within the program(s) to which I am assigned I do participate [X] I do not participate [ ]	[ ] initiating the selecting of a population to be served	
	[X] approving the selection of population to be served, submitted by	Supervisors
	[X] consulting with the following people on making the selection of population to be served	Supervisors and Assist. Superintendent
	[ ] notifying the following persons of the decision on population to be served	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
2. setting objectives within the program(s) to which I am assigned I do participate [X] I do not participate [ ]	[ ] initiating the setting of the objectives	
	[X] approving objectives submitted by	Supervisors
	[X] consulting on the setting of objectives with	Supervisors
	[ ] notifying the following persons as to what objectives have been set	
WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
3. changing objectives of the program to which I am assigned I do participate [X] I do not participate [ ]	[X] initiating the selecting of changes in objectives	
	[X] approving changes in objectives submitted by	Supervisors
	[X] consulting on changes in objectives with	Supervisors
	[ ] notifying the following persons on changes in objectives	
WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
4. setting the relative importance of objectives of the program to which I am assigned I do participate [X] I do not participate [ ]	[ ] initiating the setting of relative importance of objectives	
	[X] approving the setting of relative importance of objectives submitted by	Supervisors
	[X] consulting on setting the relative importance of objectives with	Supervisors
	[ ] notifying the following persons on the setting of the relative importance of objectives	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
5. changing the relative importance of objectives of the program to which I am assigned I do participate [X] I do not participate [ ]	[ ] initiating changes in the relative importance of objectives	
	[X] approving changes in the relative importance of objectives submitted by	Supervisors
	[X] consulting on changing the relative importance of set objectives with	Supervisors
	[ ] notifying the following persons of the relative importance of set objectives	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
6. establishing policy within the program to which I am assigned I do participate [X] I do not participate [ ]	[X] initiating the establishing of policy	
	[X] approving the establishment of policy submitted by	Supervisors
	[X] consulting on the establishment of policy with	Supervisors
	[ ] notifying the following persons on the established policy	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
7. replacing policy within the program to which I am assigned I do participate [X] I do not participate [ ]	[X] initiating the replacing of policy	
	[X] approving the replacement of policy by	Assistant Superintendent and Directors
	[X] consulting on the replacement of policy with	Assistant Superintendent
	[X] notifying the following persons of the replacement of policy	Assistant Superintendent

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
8. establishing a new program	[X] initiating the establishment of a new program	
I do participate [X] I do not participate [ ]	[X] approving the establishment of a new program submitted by	Supervisors
	[ ] consulting on the establishment of a new program with	
	[ ] notifying the following persons of the establishment of a new program	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
9. modifying the program to which I am assigned	[X] initiating program modifications	
I do participate [X] I do not participate [ ]	[X] approving program modifications submitted by	Supervisors
	[X] consulting on program modifications with	Supervisors
	[ ] notifying the following persons of program modifications	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
10. replacing the program to which I am assigned	[X] initiating replacement of a program	
I do participate [X] I do not participate [ ]	[X] approving a proposal for replacement of a program by	Supervisors
	[X] consulting on the replacement of a program with	Supervisors
	[ ] notifying the following persons on the replacement of a program.	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
11. employing personnel for the program to which I am assigned I do participate [X] I do not participate [ ]	[ ] initiating the employing of personnel	
	[X] approving requests for the employment of personnel submitted by	Supervisors
	[X] consulting on the employment of personnel with	Assistant Superintendent
	[ ] notifying the following persons of the employment of personnel	
WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
12. assigning personnel within the program to which I am assigned I do participate [X] I do not participate [ ]	[X] initiating the assign-ments of personnel	
	[X] approving the assignment of personnel submitted by	Supervisors
	[X] consulting on the assignment of personnel submitted by	Supervisors
	[ ] notifying the following persons of the assignment of personnel	
WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
13. dismissing personnel within the program to which I am assigned I do participate [X] I do not participate [ ]	[ ] initiating the dismissal of personnel	
	[ ] approving requests for replace-ment of personnel submitted by	
	[X] consulting on the replacement of personnel with	Assistant Superintendent
	[ ] notifying the following persons of the replacement of personnel	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
14. purchasing I do participate [X] I do not participate [ ]	[ ] initiating decisions about what is to be purchased	
	[X] approving purchases by	Superintendent and Assistant Superintendent
	[X] consulting on purchasing with	Supervisors
	[ ] notifying the following persons of purchases	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
15. budgeting I do participate [X] I do not participate [ ]	[X] initiating preparation and operation of budgets	
	[ ] approving budgets submitted by	
	[X] consulting on budget preparation with	Supervisors
	[X] notifying the following persons of approved budgets	Supervisors

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
15. disseminating information I do participate [X] I do not participate [ ]	[ ] initiating the preparing and disseminating of information	
	[X] approving information reports submitted by	Supervisors
	[X] consulting on disseminating information with	Supervisors
	[ ] notifying the following persons on dissemination of information	

WHEN DECISIONS ARE MADE ABOUT	I PARTICIPATE BY	
17. evaluating the program to which I am assigned I do participate [X] I do not participate [ ]	[X] initiating preparation of evaluations	
	[X] approving evaluation reports submitted by	Supervisors
	[X] consulting on evaluation with	Supervisors
	[X] notifying the following persons about evaluation	Private Evaluators

Signed: /s/ James Brady

REPORT OF PROGRAM CHANGE SITUATION -- FORM 9 (Form completed as an illustration)

Program Title: *"AIM"*

Funding Sources/Amount:

Federal *$53,645*
State
Local

STATEMENT OF PURPOSES (2.1) and OBJECTIVES (2.4)	Influences for Change								Unit of Change						Subject of Change																	
	Scientific Literature	Technology	Authority (Experts)	Legislative Action	Community	Professional Staff	Students	Other	Classroom	School	Local School System	County School System	State School System	National School System	Other	Population to be served Description	Teachers	Administrators	Supportive Staff	Curriculum	Methods	Materials	Schedules	Physical Resources	Objectives	Values	Policies	Time Allotment	Organization	Other
...will achieve at or above grade level.			X	X	X	X			X							*slow and reluctant math students*															

2.4 Constructing Objectives

A reservoir is constructed for known purposes; program purposes become known through the formulation of clear objectives.

ACTIVITY: The evaluator will assist in identifying or constructing objectives for each level of the program.

CONSIDERATIONS: For purposes of evaluation, objectives should be stated in the following ISDM format:

1. People variable_____The person who is expected to change.
2. Action variable_____The behavior he is to perform.
3. Program variable_____The setting or training which will prepare him.
4. Measurement technique_____The method or technique by which actual performance will be measured.
5. Criteria of success_____The expected outcome; an acceptable level of performance.

2.4 Constructing Objectives (continued)

An objective is a statement of program purpose or intent. Because sound objectives are crucial to the evaluation process, the evaluator will work very closely with your organization at this point.

Decision-making personnel at each level of a program will be asked to write objectives, using ISDM sample form 10. The evaluator will review these written objectives to determine if they meet format requirements. If any of the format elements are missing, he will make revisions. He will then confer with your organization to determine if the rewritten objectives are accurate.

The following is a sample objective:

> A nine-year-old student in the tutorial reading program will demonstrate his ability to read by reading a 100 word passage orally with no more than five mistakes.

1. People variable: a nine-year-old student
2. Action variable: will demonstrate his ability to read
3. Program variable: tutorial reading program
4. Measurement techniques: reading a 100 word passage orally
5. Criteria of success: no more than five mistakes

MEASUREMENT ECHNIQUE

Because the application of proper measurement technique to a corresponding objective is a specialized skill, this part of the objective is not always formulated by the decision-maker. If the decision-maker does not specify a technique, it will be determined by the evaluator.

Measurement technique may be applied to three domains of human learning behavior illustrated on the cube at the end of this section: cognitive, affective and psychomotor. The cognitive domain represents recall, recognition or expression of intellectual skills and abilities. The affective domain represents interests, attitudes and values. Manual and motor skills are included in the psychomotor domain. These three domains are referred to as action variables.

Methods or techniques for measuring action variables are the responsibility of the evaluator. For example, he might suggest an achievement test to measure performance in the congitive area, attitude scales for measurement in the affective area, and in the psychomotor area, the evaluator might suggest observation systems, rating scales, or checklists. Measurement technique will identify actual behavior demonstrated for a given objective.

CUBE CLASSIFICATION: SEEING FORMAT ELEMENTS IN THREE DIMENSIONS

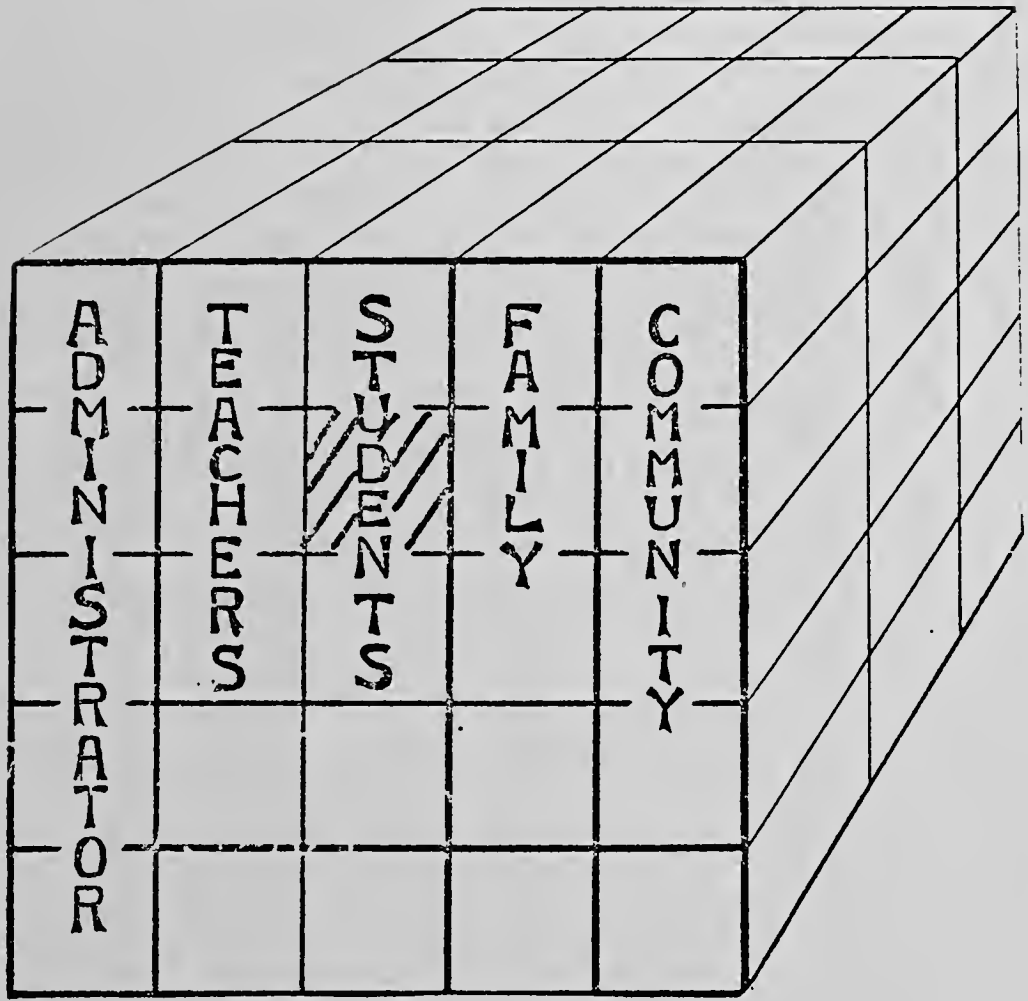
It is important that program personnel understand the focus of their objectives. One way to focus them is to classify the objective's format elements on a three-dimensional cube. The three dimensions represent people, action and program variables. The cube also provides a means of illustrating actual or expected outcomes within the action variable. The results of the measurement technique are actual outcomes, and criteria of success are the expected outcomes. In the sample reading objective, the expected outcome is that the student will read 100 words orally with no more than five mistakes. The actual outcome may be that the student will make either more or less than five errors in reading the 100 words.

The cube may help to visualize the interrelationships among the basic parts of an objective. The format elements are listed on the following pages together with illustrations of their positions on the cube.

If the expected behavior differs from the actual, measured results, this information may be useful in determining future objectives and program direction. Or, if in classification, the objectives do not fall within the area your program is seeking to improve, new objectives will have to be constructed.

CUBE CLASSIFICATION:

SEEING FORMAT ELEMENTS IN THREE DIMENSIONS



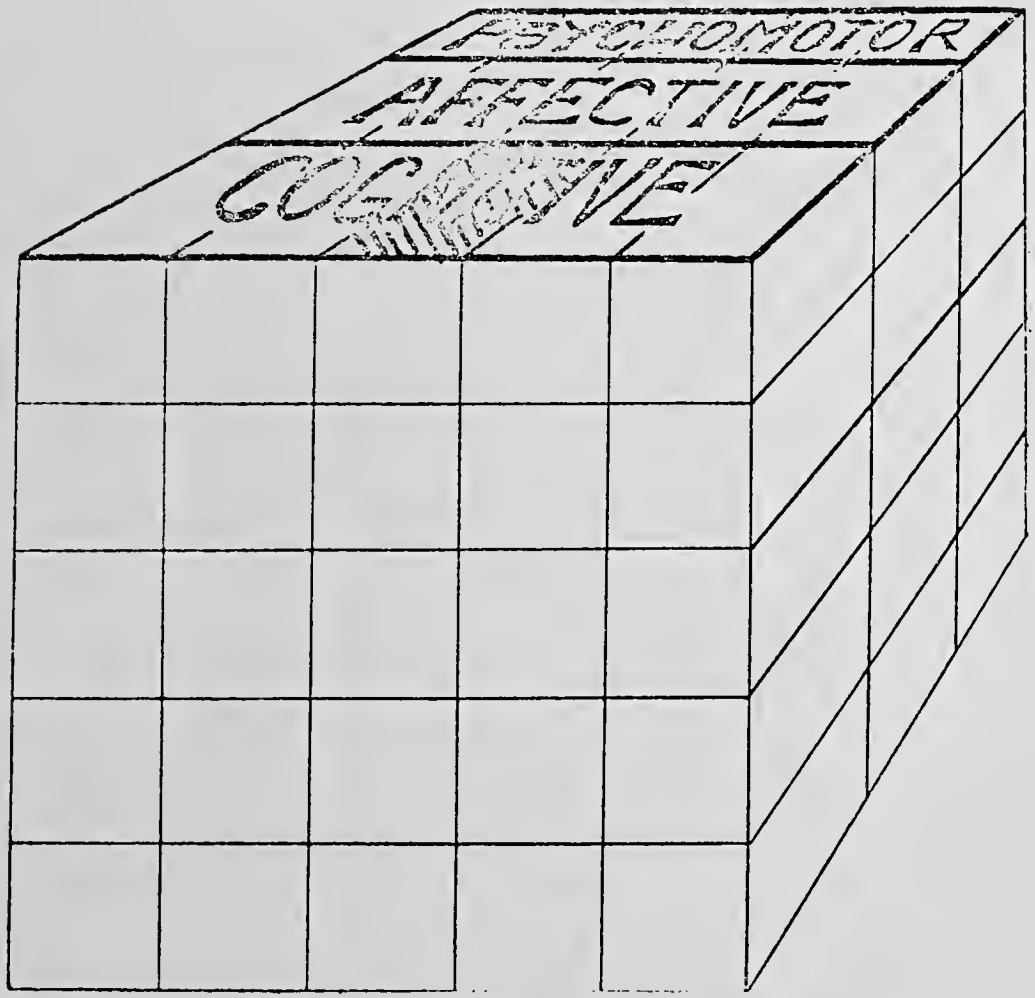
PEOPLE VARIABLES

The shaded area in the face of this cube shows:

1. People (student) "...nine-year-old student..."

CUBE CLASSIFICATION:

SEEING FORMAT ELEMENTS IN THREE DIMENSIONS



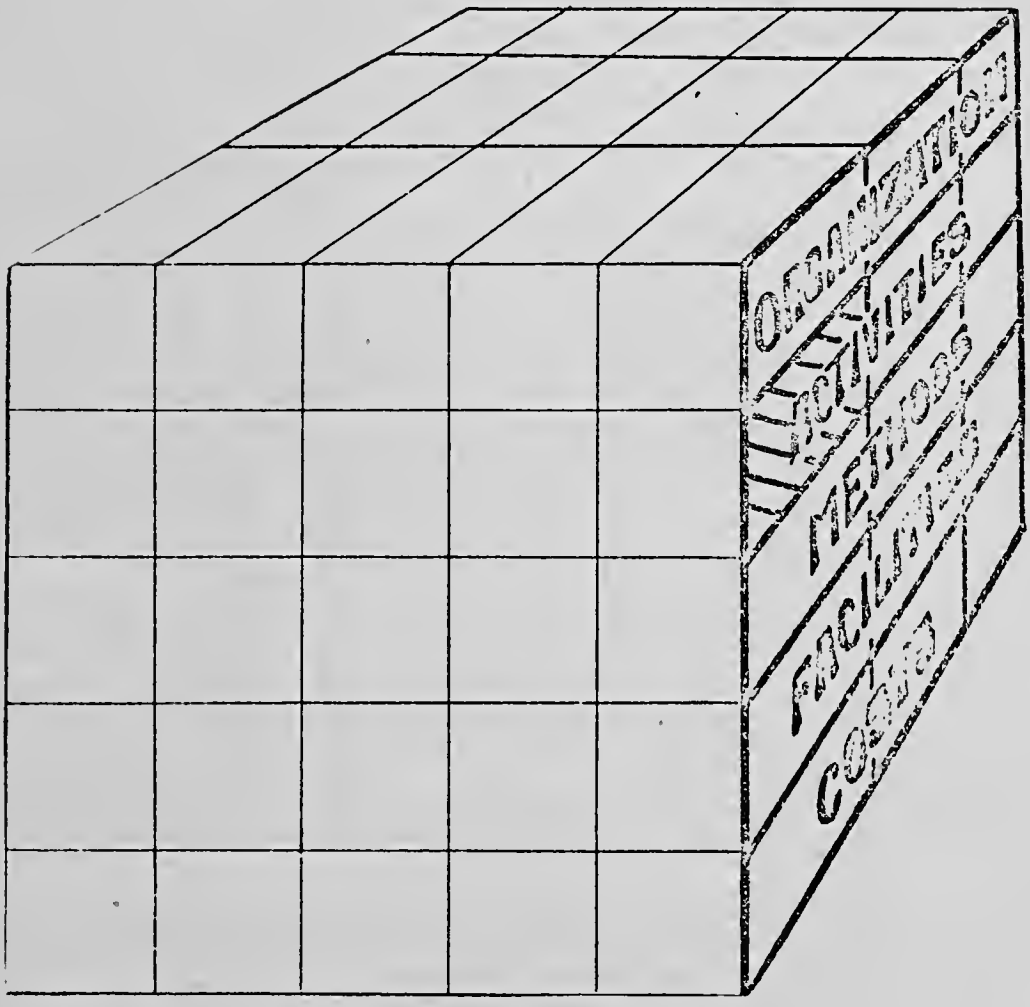
ACTION VARIABLES

The shaded area on the top of the cube represents:

2. Action (cognitive) "...will demonstrate his ability to read..."

CUBE CLASSIFICATION:

SEEING FORMAT ELEMENTS IN THREE DIMENSIONS

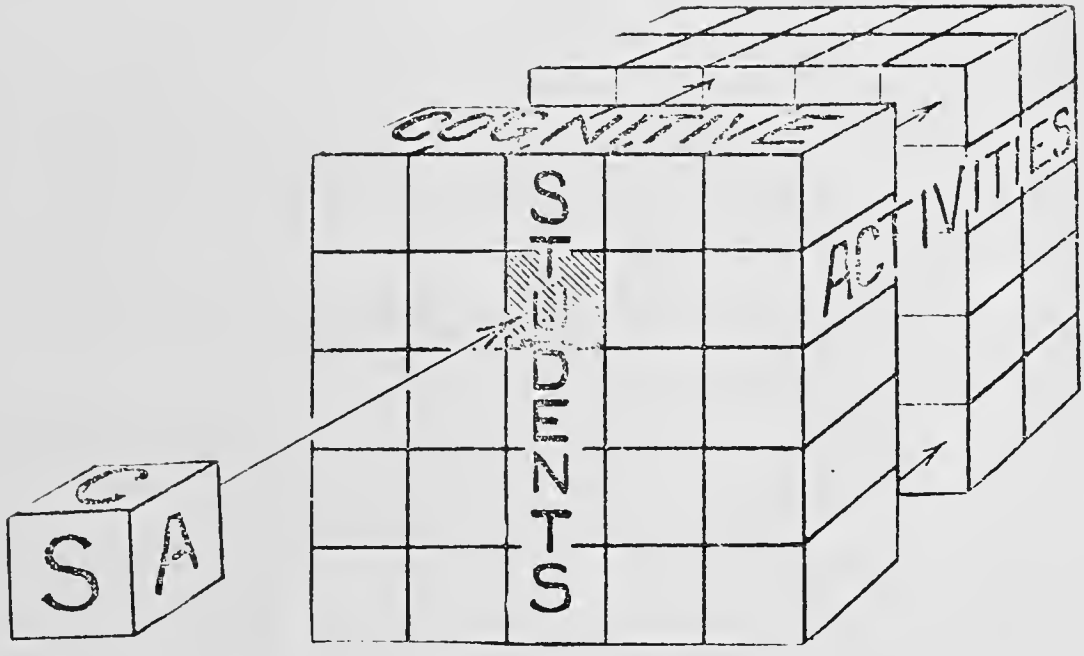


PROGRAM VARIABLES

The shaded area on the side of the cube represents:

3. (Program activity) "...the tutorial reading program..."

CUBE CLASSIFICATION
SEEING FORMAT ELEMENTS IN THREE DIMENSIONS

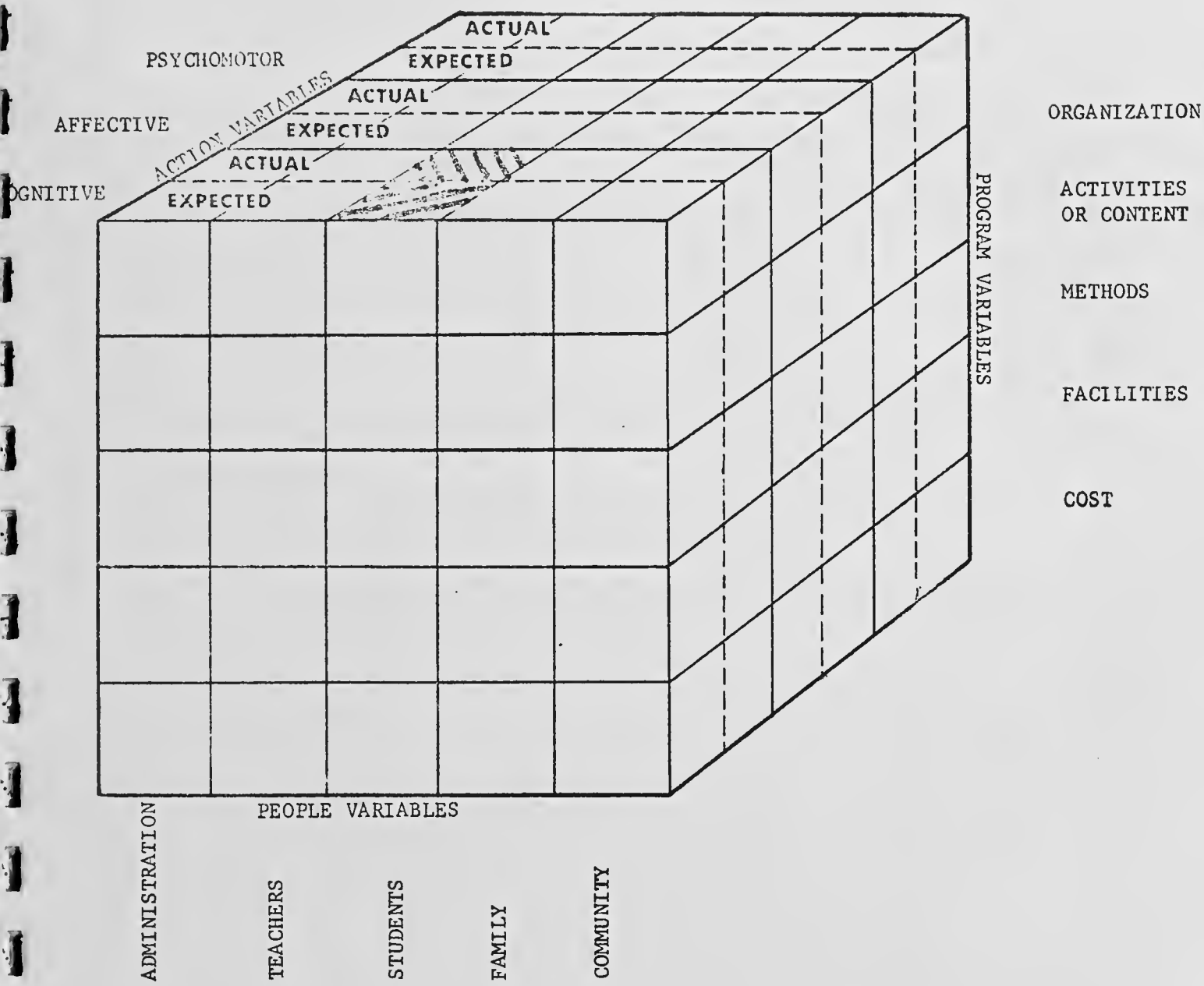


THREE VARIABLES

Pulling the identified smaller cube from the larger one illustrates the three areas covered by the objective:

1. People - Students
2. Action - Cognitive
3. Program - Activities

CUBE CLASSIFICATION:
SEEING FORMAT ELEMENTS IN THREE DIMENSIONS



The remaining format elements of an objective are shaded above:

4. Measurement technique (actual outcome), "...[results of] a 100 word [oral reading test]..."

5. Criteria of success (expected outcome), "...less than five mistakes..."

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Requests written objectives from personnel	Using form 10
	2. Reviews, rewrites objectives and suggests measurement techniques	Using ISDM format for writing objectives
	3. Confers with appropriate personnel about rewritten objectives	By scheduling appointment
	4. Classifies and records objectives by format elements	Using the cube
	5. Files completed objectives	According to program, project or management level

PROGRAM OBJECTIVE REQUEST -- FORM 10
(This is a sample form)

1. Program Title

"AIM" (Achievement Improvement in Mathematics)

2. Objectives

Please attach a list of objectives fitting the following format as closely as possible.

An objective is a statement of purpose or intent that includes: 1) people variable, 2) action variable, 3) program variable, 4) measurement technique and 5) criteria of success.

a) "People variable" identifies the person(s) who will be the subject(s) of the objective statement (WHO?).

b) "Action variable" identifies what the subject variable will be expected to do (WILL DO WHAT?).

c) "Program variable" identifies the dimension in which the subject variable will perform (WHERE?).

d) "Measurement technique" identifies the method and/or instrument that will be used to determine whether the performance as described was accomplished. (Because of the difficulty in applying the proper measurement technique with a corresponding objective, the measurement method does not have to be developed by the objective writer.)

e) "Criteria of success" predetermines a level of accomplishment which will be deemed acceptable.

"A nine-year-old student in the tutorial reading program will demonstrate his ability to read by reading a 100 word passage orally with no more than five mistakes."

2.5 Constructing Questions

To assure water quantity and quality, a reservoir must be checked. Is the reservoir serving those purposes for which it was designed? Questions about education programs are formulated and answered to check whether objectives are being met and, if not, to determine possible reasons for failure.

ACTIVITY: In cooperation with the decision-maker, the evaluator will construct questions to be answered about program objectives.

CONSIDERATIONS: Question construction is a creative effort accomplished by interaction between the evaluator and the decision-making staff. Questions are devised to analyze the effectiveness of your program objectives.

Information collected in previous sections (e.g., Sections 2.1 through 2.4) can be used to help construct these questions. The ISDM cube can also aid in the formulation of relevant questions. For example, the obvious question for the reading objective is "Did the student read

100 words orally with no more than five mistakes?"

SAMPLE QUESTIONS: THE READING OBJECTIVE

> A nine-year-old (third grade) student will demonstrate his ability to read, by reading 100 words orally with no more than five mistakes.

If the objective was accomplished, the decision-maker might want to know how the program variables affected the achievement of the objective.

1. Organization: Did the organizational pattern for teachers and students help to achieve the objective?

2. Activities or content: Did the teacher demonstrate cognitive behavior in reading content that will insure achievement of the objectives?

3. Methods: What instructional methods were used to develop students' oral reading skills?

4. Facilities: Were reading laboratory facilities adequate for the achievement of the objective?

5. Cost: How much did it cost to achieve this objective?

Question construction is limited only by available information and the creative ability of the evaluator and decision-maker. Available information depends on interaction between staffs, while creative ability will be tested when you and the evaluator review, revise and rewrite the questions formulated from program objectives.

Special care should be used in phrasing the final questions since the evaluator will develop alternative answers, alternative actions and criterion variables from them.

Working on ISDM form 12, the evaluation staff will consider and record as many alternative answers as possible. Alternative actions, intended for the evaluator, are developed in response to the alternative answers. Criterion variables are measurement techniques which can be used to answer questions. These are often developed in consultation with technical personnel.

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Obtains and records program title, program definition	By reviewing Section 2.1 and entering on form 10
	2. Obtains and records action verb, objectives and their source(s)	By reviewing Section 2.4 and entering on form 10
	3. Schedules visits with decision-makers and meets with then	By making appointments and discussing forces that may affect program
	4. Constructs and records questions	Using information from meetings with decision-makers and recording on form 10
	5. Schedules meetings and meets with decision-makers	By making appointments and discussing questions that "emerged" and were constructed
	6. Revises questions	By considering information from second meeting with decision-makers
	7. Develops alternative responses	By preparing list of possible alternatives and recording on form 11

2.5 Constructing Questions (continued)

Who	Does What	How
Evaluator	8. Develops and records alternative activity for evaluation	By referring to alternative answers developed in Section 2.1 and recording on form 11
	9. Suggests and records measurement for criterion variable	By consulting with instrument specialist and recording on form 11
	10. Files completed form	With file to be used in instrumentation development, Section 3.2

(Form completed as an illustration.)

QUESTION DEVELOPMENT FORM 11

INSTRUCTIONS: This form is to be completed by the Evaluator. Use a separate for for each project objective.

PROGRAM TITLE: *Third Grade Tutorial Reading Program*

SOURCE OF OBJECTIVE: *Application Plan*

Objective:	Classification of Objective		
	People	Program	Action
A nine-year-old pupil in the tutorial reading program will demonstrate his ability to read by reading 100 words orally with no more than five mistakes.	*Pupil*	*Tutorial Reading Program*	*Will demonstrate his ability to read*

Questions to be answered:

1. *Was the objective met?*
2. *What did successful pupils have in common?*
3. *What did unsuccessful pupils have in common?*

QUESTION DEVELOPMENT FORM 12

INSTRUCTIONS: This form is to be completed by the evaluator. (Form completed as an illustration)

Questions to be Answered	Alternative Answers	Alternative Actions for Evaluation	Criterion Variables
1. *Do pupils have skill disabilities?*	*Yes*	*Check for specific skill disability areas*	*Battery of Academic Skills*
	No	*Recycle, check for learning disabilities*	

Signed: *Alex Gregory*
Program Supervisor

3.1 Identifying Data Sources

Samples can reveal the quality of a reservoir's water, while sampling a population can reveal characteristics helpful in answering the questions constructed for program objectives.

ACTIVITY: The evaluator will plan procedures for gathering data to be used in answering questions about program objectives.

CONSIDERATIONS: He will identify what data is needed, the data source, data form, population involved and sample size required. He may also need to identify a sampling procedure.

If the data needed concerns people or programs, the evaluator will determine

data--What data is to be obtained?

data source--Where is the data? Who has it? Who is contacted in order to obtain it? If it is not available, a potential source must be located.

data form--Is the data recorded or non-recorded? Is it on file, computer cards, etc.?

In addition, if the needed data concerns people, he will determine

population--Who are the individuals or elements involved? What is the total number of individuals involved?

sample size required--What is the number of people within a population needed to gather requested information?

sampling procedure--What is the suggested sampling method?

An important consideration in gathering data about large groups of people is that information concerning characteristics of all individuals in the group may be unavailable or too expensive to collect. The fundamental assumption underlying use of statistics is that reliable statements about populations can be made by examining characteristics of a smaller number of individuals who are representative of the population as a whole.

Three principles are fundamental to proper utilization of statistics: (1) the smaller number of individuals, called the sample, must be chosen in a manner which assures that they are indeed representative of the larger group called the population;

(2) the sample must include a large enough number of these representative individuals; and

(3) the proper statistical procedure must be chosen to correspond to the kind of data which is being gathered.

SAMPLING

In most situations the evaluator will face, he will have a choice of methods in selecting a sample which is representative of the population. If he can select a sample which is truly drawn at random, and if the sample is large enough, he can be confident of statements made about the population. In a randomly selected sample, each individual theoretically has an equal chance to be included in the sample. In an instance where the population is finite (for example, all eighth grade typing students in a school), a simple and reliable method of insuring randomness is to employ a table of random numbers.

In some situations, the evaluator may be confronted with a population so large as to render simple random sampling unwieldy. Suppose that he intends to discover how voters in a community regard a proposed school bond levy. Here,

the appropriate technique may be stratified random sampling, in which the evaluator must pick his sample so that the individuals included in it are in the same proportions as they occur in the population. For example, he may have to know what percentage of the population is female, over 50, earns $10,000 or more annually, is Protestant, or has any other characteristic relevant to his study.

Often, however, the evaluator may not be able to pick a sample, but rather must work with one which is available to him. In this case, he must attempt to correct for existence of any overrepresentation of categories which he can identify in the sample.

ERRORS

Even when the evaluator has chosen a sample at random, he cannot make reliable statements about the population unless the sample size is large enough. For example, one person may be chosen purely at random, but his characteristics may tell very little about a group of 100 bird watchers to which he belongs. Consequences of using a non-representative sample were illustrated by a 1948 presidential election prediction. After voters who

had telephones were polled, Dewey was picked to beat Truman. Although the prediction was correct for voters who had telephones, it was incorrect for the total population. Failure to pick a truly representative sample of the voting population invalidated the prediction.

In general, the smaller the population, the greater the proportion which must be included in the sample. Whenever the sample is too small, the effect of sampling error may make inferences unacceptable. This error is the difference between the population's real characteristics and those attributed to it from analyzing the sample.

3.1 Identifying Data Sources (continued)

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Reviews sections on boundaries (2.1), people and program variables (2.2), decision structure (2.3), objectives (2.4), questions (2.5)	By referring to file containing information on each Section
	2. Records information that exists or is needed for each Section reviewed, records source and form of information, records population	Using form 13
	3. Determines and records sample size required and sampling procedure	Using form 13

DATA SOURCE FORM

(This is a sample form) FORM 13

DATA
(Instrument results, unanswered questions, etc.)

Student's individual I.Q. scores

SOURCE
(Where is data? Who has it? Contact for obtaining?)

Student file, Mr. Jones, Guidance

FORM OF DATA
(Is it recorded or non-recorded, on file, on computer cards, etc.?)

9th grade math students in Lyndale --Computer printout 500

SAMPLE SIZE REQUIRED
(Number needed to gather requested information.)

50

SAMPLING PROCEDURE
(Short description of suggested method.)

Select every 10th student from an alphabetic list

3.2 Selecting Instruments for Evaluation

If a check on the water quality of a reservoir were needed, an appropriate instrument would be applied in making the test. If it were necessary to isolate a certain type of bacteria present in the water, another kind of instrument would be utilized. Instruments vary with the kind of data being gathered.

ACTIVITY: The evaluator will select or design valid and reliable instruments for use in gathering needed program data.

CONSIDERATIONS: Specifications for evaluation instruments (e.g., questionnaires, aptitude tests, achievement tests, statements of opinions) will include

1. statement of needed data,
2. statement of instrument's reliability (does it gather similar data consistently?) and validity (does it gather pertinent data?), and
3. statement regarding pilot test results.

If specifications cannot be met by existing instruments, construction of new instruments becomes necessary. New evaluation instruments should be pilot tested before field use. Periodic review of instruments and their ability to meet the criteria of validity and reliability is also recommended.

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Determines needs for instruments	By reviewing Sections 1.2 and 2.1 through 2.5
	2. Obtains and reviews existing instruments or	By checking a. data needs b. reliability and validity c. pilot results
	3. Constructs needed instruments in cooperation with instrument specialist	
	4. Pilot tests instruments, if necessary, on similar populations	
	5. Files completed instrument	

3.3 Gathering Conditions

Data is used in different ways, just as a reservoir is used for water and power supply, food control, irrigation and recreation. A schedule will be devised at this time for gathering data to answer various program needs.

ACTIVITY: The evaluator will develop a schedule for gathering the data to be used in answering questions about program objectives.

CONSIDERATIONS: Data to be gathered has been identified; the schedule for data gathering will be determined at this point. The following items might be included in the schedule, recorded and filed (see sample form 14 on page 81):

- name of program,
- name of instrument,
- who will gather the data,
- sampling unit required,
- time required for administration,
- approximate date of administration, and
- setting for instrument administration.

3.3 Gathering Conditions (continued)

In developing a schedule, the evaluator will

(1) review instructions for gathering data,

(2) determine the number of persons necessary to gather the data,

(3) locate a suitable place for instrument administration, and

(4) consider program policies when deciding who will be responsible for administering an instrument.

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Obtains all instruments which have been constructed in Section 3.2	By retrieving them from the "Instrument File"
	2. Determines and records who should administer what instrument	Using form 14
	3. Reviews sampling unit procedure from Section 3.1 and records sampling unit required	Using form 14
	4. Records time required for administration	Using form 14
	5. Determines and records setting for administration of instruments	Using form 14
	6. Constructs schedule for administration of instruments	By referring to information notes from the above steps

(Form completed as an illustration.)

COLLECTION CONDITIONS
FORM 14

INSTRUCTIONS: Complete the form by supplying the information requested in each column.

NAME OF PROGRAM	NAME OF INSTRUMENT	WHO WILL ADMINISTER	SAMPLING UNIT REQUIRED	TIME FOR REQUIRED ADMINISTRATION	APPROXIMATE DATE OF ADMINISTRATION	SETTING FOR ADMINISTRATION
"AIM"	*Henmon-Nelson Test of Mental Ability (Rev)*	*Classroom Teacher*	*Any one of the three classes*	*Approximately 30 minutes*	*March 1, 1971*	*Regular classroom*

3.4 Organizing Data

If a reservoir has either too much or too little water, its function is impaired. The organization of data to be gathered must be controlled if data is to be functional.

ACTIVITY: The evaluator will specify the amount and grouping of needed program data and will devise logical means by which to record that data.

CONSIDERATIONS: To control the amount of data gathered, to determine what grouping will best meet the intended use of the data and to devise logical systems for filing and retrieving that data, three procedures must be completed:

1. stating the unit of organization,
2. establishing storage and retrieval requirements, and
3. establishing quality control procedures.

UNIT OF ORGANIZATION

The detail and coding format of data must be selected with you, the decision-maker, in mind. The smallest data unit required is related to your information needs and intended use; it is the basis for storage, retrieval, analysis and reporting. For example, if an analysis of each item on a test is desired, this analysis could be the smallest data unit to be stored. A frequency distribution might be sufficient record of performance by grade level or program.

STORAGE AND RETRIEVAL

Storage and retrieval requirements include

- coding format for storage,
- storage procedures, and
- storage and retrieval facilities.

The evaluator may work with data processing representatives to develop a data storage plan. If a manual filing system is used, each stored form, chart or listing should be fully labeled; a master cross-reference index to

data holdings will be necessary. In all systems, whether manual filing or computer storage, it must be remembered that personnel who retrieve the data will not necessarily be those who stored it originally.

The evaluator should also specify for data processors the storage and retrieval facilities to which he has access. Specifying these facilities allows the evaluator and data processors to plan their activities and to identify supportive services which might be needed, such as a faster printer to supply immediate feedback.

QUALITY CONTROL

To build quality control into the data organization system, the evaluator and data processors need to establish editing procedures and reliability checks. Quality control and editing are particularly important when critical decisions - e.g., admission of students to college - will be based on the data - e.g., students' high school grades.

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Establishes how small the data unit must be to satisfy audience needs	By referring to Sections 2.1 through 3.3 to determine information needs and information recipients
Evaluator and Data Processing Representative	2. Set coding format	By working together to meet the decision-maker's needs
Data Processing Representative	3. Establishes coding	By allowing for growth, rewrites, redesigns and hardware and software restrictions
Evaluator and Data Processing Representative	4. Document storage procedure	By classifying information according to some subject content and indexing information types
	5. Specify storage facilities	By determining volume of storage space needed
Evaluator and Data Processing Representative	6. Specify retrieval procedures and facilities	By drawing tentative output formats, getting approval for output layouts or system to draw tentative output formats, providing input layouts and new system flow, and getting approval for input and system flow
	7. Build quality control	By establishing editing procedures and reliability checks

4.1 Analyzing Data

A reservoir supplies energy potential; water is used to turn the turbine which produces power. Data flowing into the ISDM reservoir is transformed into decision-making information through data analysis.

ACTIVITY: To satisfy the information needs, the evaluator will determine and apply methods of data analysis.

CONSIDERATIONS: Data analysis refers to aggregation or groupings of data for decision-making. Aggregation methods for the two basic types of data include:

1. descriptive or comparative data--aggregation into group or summary data such as frequency distributions and statistics of central tendency (average, middle score, most frequent score and variation), and

2. explanatory or predictive data--aggregation into performance level on objectives or other variables being measured.

The evaluator should be careful to avoid losing valuable information while forming aggregates. An example of over-aggregation might be reduction of all classroom performance scores to one mean (arithmetic average) for the group; then if individual pupil performance data were later desired, only classroom data summaries would be available.

The purpose of analysis is to transfer raw data into information. Two criteria must be met for this process:

1. original data must contain desired information or have a known relationship to it, and

2. desired information must be presented in a form understandable to the audience. For example, it might be necessary to prepare graphs or charts rather than using mathematics or technical language.

Four categories of data analysis have been identified and some common needs linked to them. Form 15 will be used to record descriptions of analysis methods.

DESCRIPTIVE ANALYSIS

Descriptive analysis is a depiction of what exists, such as the number of pupils in a school, their ages, sex, present level of performance or non-performance. This type of analysis is not intended to examine relationships or to make comparisons.

Descriptive data is conveyed in either numerical or expository (written narrative) form, depending on the situation. The numerical form is used where data is already in the form of numbers or is easily converted to numbers. Analysis of numerical descriptive data may be limited to simple counts or

tabulations or to measurement of central tendency. This type of analysis will most frequently use descriptive statistics. The evaluator or other specialized personnel will help you, the decision-maker, choose a proper analysis technique.

When a significant information loss might result from changing data into statistics, the expository descriptive form should be used. This type of analysis is subjective and involves the evaluator's value judgments. This fact is an important consideration and should be specified when reporting an expository analysis.

COMPARATIVE ANALYSIS

Where it is necessary to compare two or more situations, methods or processes, comparative analysis is used. Relative or absolute standards may be applied in this type of analysis.

Relative standards are used to identify differences in behavior. So that dependent variables may be compared, subject groups must have at least one common, independent variable (e.g., age, sex, or socioeconomic status). Basically descriptions of two or more groups are being compared with one another.

When absolute standards are used, one or more groups are compared to an ideal or set level of performance, rather than compared to another group. (For example, all students might be required to demonstrate mastery of the multiplication tables at the end of the fifth grade. Another level of mastery would be requiring all students to score at least at the eighth grade norm in mathematics prior to graduation.)

Comparative data may be numerical or expository. Numerical data should be used unless there is a possibility that significant information would be lost. Once again, the subjectivity of expository comparative analysis is emphasized.

EXPLANATORY ANALYSIS

Explanatory analysis seeks to determine causes for an event. For example, a comparison of groups reveals differences in performance. To what can these differences be attributed?

In explanatory data analysis, the data collection design should minimize the influence of extraneous variables <u>not</u> under study. Without this control,

variables not under study interfere with determining possible cause-effect relationships between variables which are being studied.

PREDICTIVE ANALYSIS

Prediction is concerned with data that can reliably predict an outcome, not with what has caused a certain kind of behavior. (For example: college admissions officers use various test results to predict college performance, counselors use test results to advise students on potentially rewarding careers, and early school admissions are based on predictions of readiness for first grade.)

Analysis of predictive data usually will make use of statistical techniques; it is possible that expository data might be used but, again, the subjective factor may affect prediction accuracy.

WORK BREAKDOWN

Who	Does What	How
Evaluator	1. Reviews information needed for decision-making	By referring to Section 2.5
	2. Summarizes information needed	Using form 15
	3. Reviews unit of data organization	By referring to Section 3.4
	4. Summarizes unit of organization	Using form 15
	5. Summarizes sampling unit	Using form 15
	6. Selects analysis method	By using information obtained from the above steps, his experience and training
	7. Analyzes the data	According to analysis method selected
	8. Files form	

SUMMARY FOR DATA ANALYSIS -- FORM 15
(Form completed as an illustration)

INSTRUCTIONS:

1. Refer to the information needed for decision-making.

2. Refer to the sampling unit and the unit of organization of data.

3. The information from 1 and 2 above will be reviewed and summarized by recording on the Summary for Information Analysis.

INFORMATION NEEDED	SAMPLING UNIT	UNIT OF ORGANIZATION	ANALYSIS METHOD
Is a student's mental ability score indicative of mathematics achievement? 1) Student's individual Hermon-Nelson scores and 2) SAT Mathematics Achievement scores	*Every 10th student from an alphabetic list of 500 Lyndale 9th grade students*	*Individual "Raw Scores"*	*Analysis of variance*

4.2 Reporting Information

The potential of the ISDM reservoir is finally realized when reports flow from it to you.

ACTIVITY: The evaluator will describe a plan for reporting which includes assignment of reporting responsibilities within his team, identification of report audiences, guidelines for report preparation, and recommendations for report dissemination.

CONSIDERATIONS: Reported information must communicate! To be useful, information should be

Understandable: Does the information communicate with the intended audience?

Reliable: Have procedures for gathering data been used equally well by different people to provide sound information?

Objective: Are biases in information explicit?

Relevant: Is the information pertinent to the decision?

Important: Is the information significant and conclusive?

Accurate: Are distortions or irregularities in the information understood and accounted for?

Timely: Does information arrive in time to be useful for decision-making?

Pervasive: Does information reach all decision-makers who have been designated as recipients?

Comprehensive: Is information being provided for all areas of the evaluation?

REPORTING RESPONSIBILITY

Providing information is the goal of ISDM. It is not necessarily, however, a terminal activity; it may be continuous or periodic. The evaluator--if he is not to do the reporting himself--must be certain to assign reporting responsibility to a person well acquainted with the information system. The reporter should be familiar with the program under evaluation and its personnel. He should assist in designing data-gathering techniques so these will be compatible with a coherent report. Since success of the report depends on the reporter's ability to assimilate evaluation findings, he should work closely with evaluation and management teams.

AUDIENCE IDENTIFICATION

The first reporting activity should be identification of report recipients. Report audiences will be categorized into two groups, mandated and supplementary.

Mandated audiences are persons or organizations requiring a statement of the evaluation findings, either by law or by stipulation in the original evaluation contract. These may, for example, be federal or state author-

ities or funding sources. The evaluator should review the policy statements regarding report dissemination in order to identify these audiences specifically.

Reports may also be disseminated to supplementary audiences. These audiences might include parents, students, teachers or community groups. For a comprehensive reporting program, the reporter should interact with decision-makers at various levels to identify audiences. He must make certain, however, that his plans to include supplementary audiences do not violate existing policy for report distribution.

PREPARATION OF REPORTS

The reporter must transmit all important findings and conclusions to the report audience. His report must be pertinent and useful and designed to meet the needs of the audience. If evaluation results are to be reported to more than one audience, the possibility of preparing separate reports should be explored. (For example, a program decision-maker would need a detailed report; the Superintendent of Schools might require only a statement of findings and conclusions.)

The reporter must select a reporting medium which will effectively communicate with intended audiences. A clear, well-organized written report may be suitable for a decision-maker; a concise memorandum may be an effective report for an audience within the reporter's organization. Television, radio, or news publications may communicate with large or widespread audiences, while a verbal summary may be effective for a small group. The reporter should explore the value of these and other reporting media. He must consider limitations such as funds budgeted for reporting, degree of formality required by the audience, policy restrictions, and contract terms.

REPORT DISSEMINATION

The evaluator will plan procedures for producing and transmitting reports. By referring to the section on policy (Section 1.2) the evaluator will be able to identify current reporting policies.

At this point in the system, it is crucial that reports reach the right audiences at the right time. In order to schedule and stage report presentations, a production network must be planned. Since many people will have

production responsibilities--evaluators, audiovisual personnel, data processors, proofreaders, printers, artists, administrative staff, etc.--careful communication is essential to insure successful presentation.

Since reporting and evaluation are often concurrent, the reporter and evaluator should prepare a schedule listing specific dates when reports are to be available to their audiences. This schedule may describe a series of report procedures or it may be designed to provide continual reporting on changing situations within the program. In any case, the schedule must observe deadlines and time requirements of report audiences.

Receptivity is an important part of reporting and the channels and hierarchy of administration should be observed to assure expedient and acceptable dissemination routes. Protocol, as well, should receive some attention. Each situation will require a flexible flow of reporting.

WORK BREAKDOWN

Who	Does What	How
Reporter from Evaluation Team	1. Receives reporting assignments from evaluator	By meeting with evaluator
	2. Identifies report audiences including: (a) Mandated (b) Supplementary	By referring to Sections on policy (1.2) and decisions (2.3) and referring to source of funding, authority, etc., in Sections on boundaries (2.1), people and program variables (2.2), data sources (3.1), and conferring with program supervisor and/or project director
	3. Depicts levels of audiences to predict comprehension of and/or preference for generalized or specialized information	By assisting with formulation of organizing data (3.4), after considering audiences identified in Step 1
	4. Describes reporting, including: (a) Reporting content (b) Reporting media	By considering formal vs. informal delivery and internal vs. external consumption, constructing preliminary table of contents and settings most conducive for oral, written or graphic presentation and constructing appropriate formats
Reporter from Evaluation Team	5. Establishes reporting schedule	By setting deadlines concerning conception, design and preparation; and devising guidelines for production and delivery of reports
	6. Prepares reports	By researching, writing, editing and designing after considering composite criteria in Steps 1 through 4

INDEX OF SAMPLE FORMS

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